

PROVISIONAL COPY



Grant Spira 6-26 kW and 9-36 kW

Condensing Wood Pellet Boiler

Installation & Servicing Instructions



Important Note

Important Note for Installers

After installing the boiler leave these instructions with the Appliance.

Leave the user manual with the householder.

This appliance is deemed a controlled service and specific regional statutory requirements may be applicable.



GRANT ENGINEERING (UK) LIMITED

Hopton House, Hopton Industrial Estate, Devizes, Wiltshire SN10 2EU

Tel: 01380 736920 Fax: 01380 736991

Email: sales@grantuk.com www.grantuk.com

This manual is accurate at the date of printing but will be superseded and should be disregarded if specifications and/or appearances are changed in the interests of continued product improvement.

All goods sold are subject to our official Conditions of Sale, a copy of which may be obtained on application.

© Grant Engineering (UK) Limited 2013. No part of this manual may be reproduced by any means without prior written consent.

Contents

1 Introduction	4	7 Flue System and Air Supply	24	11 Boiler Servicing	53
1.1 How the Condensing Wood Pellet Boiler Operates	5	7.1 Air Supply	24	11.1 General	53
1.2 Boiler Description	5	7.2 Flue Position and Clearances	24	11.2 Checks Before Servicing	53
1.3 Boiler Models	5	7.3 Flue System Assembly	25	11.3 Heating System	53
1.4 Boiler Components	6	7.4 Flue Notice Plate	27	11.4 Flue System	53
1.5 Boiler Cleaning and Servicing	7	7.5 Carbon Monoxide Alarm	27	11.5 Combustion Ventilation	54
2 Technical data	8	7.6 Flue System Components	28	11.6 Boiler	54
2.1 Boiler & Hopper Technical Data	8	7.7 Flue Component Dimensions	30	11.7 Burner Brazier	56
2.2 Boiler Input and Output Data	9	7.8 Typical Flue Systems	31	11.8 Burner Components	57
2.3 Flue Gas Analysis	9	8 Electrical	32	11.9 Re-fitting Burner	58
2.4 Boiler and Hopper Dimensions and Clearances	10	8.1 General Requirements	32	11.10 Condensate Disposal System	58
3 Pellet Specification & Storage	13	8.2 Hopper Electrical Connections	32	11.11 Burner Settings	58
3.1 Pellet Specification	13	8.3 Boiler Plug Connections	32	11.12 Safety Device Checks	59
3.2 Pellet Storage	14	8.4 Heating System Controls	33	11.13 Combustion Checks	59
4 Installation information	16	8.5 Connecting the Power Supply	33	12 Fault Finding	60
4.1 Introduction	16	8.6 Wiring Diagrams	34	12.1 General	60
4.2 Boiler Location	16	9 Burner	40	12.2 Normal Screen Display	61
4.3 Preparation for Installation	16	9.1 Burner Operation	40	12.3 No Screen Display	62
4.4 Installing the Boiler	16	9.2 Burner Operational Modes	40	12.4 Boiler Overheat Thermostat	64
4.5 Regulations	16	9.3 Burner Operational Sequence	41	12.5 Pellet Tube Thermostat	65
4.6 Heating System Design Considerations	16	9.4 Burner Display Screen	42	12.6 Failed Pellet Lighting	67
4.7 Pipework Materials	16	9.5 Burner Control Buttons	42	12.7 Servo Motor Blocked	69
4.8 Pipe Connections	17	9.6 Burner Menu Navigation Chart and Factory Default Setting	43	12.8 Probe Failure Thermostat	70
4.9 Wash System Manifold	17	9.7 Burner Menu	44	12.9 Air Pressure Error	71
4.10 Fan Box and Flue Starter	17	10 Commissioning	47	13 Spare Parts	72
4.11 Pellet Hoppers	18	10.1 Equipment Required	47	14 Health & Safety Information	80
4.12 Pellet Feed Auger	18	10.2 Preliminary Inspection	47	15 EC Declaration of Conformity	81
4.13 Before you Commission	19	10.3 Boiler	47	16 Warranty	82
4.14 Completion	19	10.4 Pellet Hopper	48		
5 Condensate disposal	20	10.5 Safety Device Checks	48		
5.1 General Requirements	20	10.6 Burner Setting	49		
5.2 Connections	20	10.7 Priming the Pellet Feed Auger	49		
5.3 Pipework	20	10.8 Lighting the Boiler	50		
5.4 External Pipework	20	10.9 Combustion Chamber Draught	50		
5.5 Condensate Soakaway	20	10.10 Flue Gas Analysis	51		
5.6 Condensate Trap	21	10.11 Customer Handover	51		
5.7 Inspection and Cleaning of Trap	21	10.12 Commissioning Report Form	52		
6 Sealed Systems	22	10.13 Commissioning Check List	52		
6.1 Sealed System Requirements	22				
6.2 Filling the Sealed System	22				
6.3 Venting the Pump	23				
6.4 Pressure Relief (Safety) Valve Operation	23				

1 Introduction



Grant SPIRA Condensing Wood Pellet Boiler & Intermediate Hopper

This manual is intended to guide Installers who have completed the Grant Wood Pellet Boiler Installer training course on the installation, commissioning and servicing of the Grant SPIRA Condensing Wood Pellet Boiler.

A separate manual is available to guide users in the operation of the boiler.

The following special text formats are used in this manual for the purposes listed:



WARNING

Warning of possible human injury as a consequence of not following the instructions in the “warning”.



CAUTION

Caution concerning likely damage to equipment or tools as a consequence of not following the instructions in the “Caution”.



NOTE

Note text: Used for emphasis or information not directly concerned with the surrounding text but of importance to the reader.

1.1 How the Condensing Wood Pellet Boiler Operates

During the combustion process, hydrogen and oxygen combine to produce heat and water vapour. The water vapour produced is in the form of superheated steam in the heat exchanger. This superheated steam contains sensible heat (available heat) and latent (heat locked up in the flue gas). A conventional boiler cannot recover any of the latent heat and this energy is lost to the atmosphere through the flue.

The Grant SPIRA Condensing wood pellet boiler contains an extra (secondary) heat exchanger which is designed to recover the latent heat normally lost by a conventional boiler. It does this by cooling the flue gases to below 90°C thus extracting more sensible heat and some of the latent heat. This is achieved by cooling the flue gases to their dew point.

The boiler has been independently tested to BS EN303-5 and will achieve the following full load efficiencies when both the boiler and system are correctly set:

Model	Nominal Output	Reduced Output
SPIRA 6-26	97.4%	96.4%
SPIRA 9-36	93.1%	98.1%

To ensure maximum efficiency from the Grant SPIRA boiler, the **boiler return temperature should be 55°C or less (but NOT less than 40°C) at maximum operating temperature.** This will enable the latent heat to be condensed out of the flue gases.

The boiler is capable of a maximum flow temperature of 75°C.

To achieve the required return temperature (55°C or less), it is recommended that the heating system is designed and balanced to operate with a temperature differential of 20°C between flow and return. The use of modulating circulating pumps (now widely available) and effective control systems should be considered.

Grant SPIRA condensing wood pellet boilers will still operate at extremely high efficiencies even when not in condensing mode and are therefore suitable for fitting to an existing heating system without alteration to the radiator sizes.

1.2 Boiler Description

The Grant SPIRA boiler uses a drop feed type burner with modulated heat output. The burner output is determined by varying the feed and pause time of the pellet feed auger supplying pellets to the burner. See Section 8 for details of burner operation.

The boiler is suitable for use on a sealed or open vented central heating system. When commissioned and set correctly, Grant SPIRA condensing wood pellet boilers will operate automatically, using a typical heating control system.

All models are supplied with the control panel and burner factory fitted. The combined fan box & flue starter, pellet feed auger and hopper are supplied separately and are fitted by the installer. See Section 4 for boiler installation.

The boiler needs to be connected to a conventional flue system. There is no provision for connection to a balanced flue system as there is draft stabilizer fitted to the appliance.

The boiler is not designed specifically for operation on a system with a buffer tank/ thermal store, however when used on such a system there is no effect on the boiler performance.

! NOTE

The only flue suitable for use with the Grant SPIRA condensing wood pellet boiler is the Grant 'Black' twin-wall insulated conventional flue system. This 125mm (5") diameter, black powder coated stainless steel flue system is suitable for both 6-26kW and 9-36kW Spira models.

For the 52kW, 62kW and 72kW double boiler installations each boiler must have a separate flue system. Refer to Section 7.

1.3 Boiler Models

The Grant SPIRA condensing wood pellet boiler is available in eleven different models:

Product Code	Model	Description
WPS626RH110	6-26	1 x 6-26kW boiler + 110kg right hand hopper
WPS626LH110	6-26	1 x 6-26kW boiler + 110kg left hand hopper
WPS626RH200	6-26	1 x 6-26kW boiler + 200kg right hand hopper
WPS626LH200	6-26	1 x 6-26kW boiler + 200kg left hand hopper
WPS936RH110	9-36	1 x 9-36kW boiler + 110kg right hand hopper
WPS936LH110	9-36	1 x 9-36kW boiler + 110kg left hand hopper
WPS936RH200	9-36	1 x 9-36kW boiler + 200kg right hand hopper
WPS936LH200	9-36	1 x 9-36kW boiler + 200kg left hand hopper
WPS1252	12-52	2 x 6-26kW boilers + 140kg double boiler hopper
WPS1562	15-62	1 x 6-26kW boiler and 1 x 9-36kW boiler + 140kg double boiler hopper
WPS1872	18-72	2 x 9-36kW boilers + 140kg double boiler hopper

1 Introduction

1.4 Boiler Components

1.4.1 Burner. The burner is supplied factory-fitted to the boiler. All burners are supplied with factory default settings. During commissioning each burner parameter will need to be checked (see Section 8), and adjusted if necessary as the flue length can have a significant effect on the boiler performance. Refer to commissioning in Section 9.

The Burner is equipped with a self cleaning device to prevent a build up of ash and clinker in the burner brazier.

The burner output is determined by the feed / pause times of the pellet feed auger supplying the burner. See Section 8 for full burner operation details.

1.4.2 Boiler. The SPIRA condensing boiler is supplied with a combined primary and secondary heat-exchanger. Both heat exchangers are equipped with a self cleaning system.

1.4.3 Boiler controls. The set-point temperature of the boiler is user adjustable via two push buttons on the burner control panel - see Section 8.4 for details.

The boiler control panel (See Figure 1.1.) is located at the top of the boiler and is fitted with three controls, as follows:

ON/STAND-BY switch – to switch off the burner when required, by interrupting the switched live supply to the burner. This switch does not isolate the electrical supply to the burner.

OVERHEAT thermostat - this allows the boiler to be used on a sealed central heating system and will automatically switch off the boiler if the pre-set temperature of 110°C is exceeded.

CLEANING switch - when pressed and held in the TEST position, it allows the cleaning system to be manually operated and tested. When released it will automatically return to the default AUTO position to allow the boiler cleaning system to perform automatically. Only operate the cleaning switch when the boiler is in 'WAIT BOILER THERMOSTAT'.

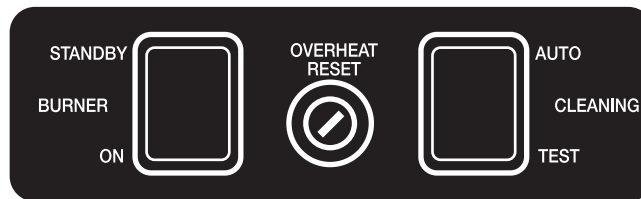


Figure 1-1: Boiler control panel

WARNING

After the burner has been switched off (either manually by the switch on the control panel, or automatically by the boiler control stat, or the heating system controls) the burner needs to burn-down the remaining pellets in the brazier. Do not open the front combustion chamber access door until the burner display reads "WAIT BOILER THERMOSTAT".

1.4.4 Boiler Pellet Hoppers. All single boilers (Spira 6-26 and 9-26 models) come with a pellet hopper. Two sizes of hopper are available for use with single boilers, as follows:

- 110 kg hopper – for storing a maximum of 110kg (≈170 litres) of wood pellets
- 200kg hopper – for storing a maximum of 200kg (≈308 Litres) of wood pellets.

There are two versions of both the 110kg and 200kg pellet hopper available for use with a single boiler:

Left hand hopper – to be positioned on the left hand side of the boiler. This is the 'standard' option and will be automatically supplied with the boiler unless specified otherwise.

Right hand hopper – to be positioned on the right hand side of the boiler. This is the 'non-standard' option and must be specified when ordering the boiler.

Both hoppers are supplied with a single 1.2m pellet feed auger, to be fitted to the hopper on site by the installer.

All 'double boiler' installations (Spira 12-52, 15-62 and 18-72 models) come with one 'double' hopper to feed both boilers. This hopper is positioned between the two boilers and stores a maximum of 140 kg (≈215 litres).

ALL the Grant pellet hoppers are for indoor use only and must be positioned in a dry environment.

Hopper contents switch

All hoppers are fitted with a contents switch. This detects when the level of pellets in the hopper falls to a pre-set minimum value and triggers the operation of either a bulk store auger, or vacuum system, to delivery pellets from the bulk pellet store.

If no bulk store is used, the contents switch will stop the burner operating when the minimum pellet level is reached.

Topping up the hopper with more pellets will automatically operate the contents switch and the burner will restart (if there is a demand for the boiler to run).

The minimum quantity of pellets required to restart the boiler is 20kg for the single boiler hoppers and 3kg for the double boiler hoppers.

All boiler pellet hoppers are for indoor use only and MUST be positioned in a dry environment free from dampness. They must be located on the same floor level as the boiler, or boilers, they are supplying.

All hoppers are mounted on four castors (with the two front castors lockable) to allow it to be easily moved when required. Allow sufficient area in front of the hopper for it to be moved out and away from the boiler(s) during servicing.

The electrical connections to the boiler(s) are all made to the 4-way electrical plug on one of the three factory-fitted 'flying leads' at the rear of the hopper. Refer to Section 7 for details.

All hoppers are supplied with a rectangular blanking plate fitted on the top rear panel. This can be removed, as required, to allow the fitting of the Grant SPIRA-VAC pellet feed system. Refer to Installation Instructions supplied with the Grant SPIRA-VAC system for further details.

This blanking plate has a single round 'knock-out' to provide an entry into the hopper from an auger supplying pellets from a bulk hopper system. This knockout is positioned to ensure the pellets drop into the hopper and operate the hopper contents switch. Only this opening **MUST** be used as making another opening in the intermediate hopper could affect the operation of the contents switch.

Electrical connection for either a bulk auger or Grant SPIRA-VAC system, if required, is made using the 6-way electrical plug and flying lead supplied factory-fitted at the rear of the hopper. Refer to Section 7 for connection details.

Always ensure that the door and top panel of the boiler hopper are fitted to ensure no foreign debris enters the hopper. If a bulk system with an auger is fitted, ensure that the bulk auger does not impede the opening of the hopper door.

1.4.5 Pellet Feed Auger. All Grant hoppers are supplied with either one or, on double boiler hoppers, two 1.2m pellet feed augers. These are set at a fixed angle of 45° to maintain a consistent feed. If the pellet feed auger angle is altered the input to the boiler will also be altered.

The pellet feed auger is a hollow spiral type. Its function is to deliver the pellets from the hopper to the burner. The output of the boiler is determined by varying the on/off periods of the pellet feed auger motor. Refer to Section 2.2 for pellet feed data.

1.5 Boiler Cleaning and Servicing

Grant SPIRA condensing wood pellet boilers are equipped with an automatic cleaning system for each of the two heat exchangers and also for the burner brazier.



CAUTION

The ash pan (located inside the combustion chamber) will need to be periodically emptied. This simple task must be carried out by the user at **MONTHLY** intervals for the **FIRST THREE MONTHS**. Thereafter, the ash pan should be emptied regularly, on at least a monthly basis, or as indicated by the amount of ash found during the first three months. Two carrying handles are supplied with the boiler to allow removal of the ash pan when hot.



WARNING

Care must be taken to avoid contact with hot surfaces.

Always wait for the boiler to cool down before opening the combustion chamber door and removing the ash pan.

The boiler **MUST** be serviced either **ANNUALLY** or when a service is indicated on the burner control panel display, whichever comes first.

Servicing should only be carried out by a Grant Approved Installer and details of each service should be recorded in the Service Log in the back of the User Operating Manual.



NOTE

The amount of ash produced varies between the different pellet brands and this will affect the frequency of cleaning and maintenance required.

2 Technical Data

2.1 Boiler & Hopper Technical Data

Model Number	Units	Spira Model	
		6-26	9-36
Maximum heat Output	kW	26	36
	Btu/hr	88,700	122,800
Flow connection	-	1" BSP (Female)	1 1/4" BSP (Female)
Return connection	-	1" BSP (Female)	1 1/4" BSP (Female)
Water content	Litres	51.5	60
Waterside resistance $\Delta T = 10^{\circ}\text{C}$	mbar	26.0	
Waterside resistance $\Delta T = 20^{\circ}\text{C}$	mbar	9.5	
Mains water (cleaning system)	bar	1 bar operating pressure	
Condensate connection	-	1 1/4" BSP (Female)	
Conventional flue	-	125mm (5") Black system	
Combustion chamber draught requirement	mbar	0.10 to 0.15 (running)	
Maximum static head	m	25	
Minimum circulating head	m	1	
Boiler temperature set point range	$^{\circ}\text{C}$	55 $^{\circ}$ to 75 $^{\circ}\text{C}$	
Boiler temperature cut out point	$^{\circ}\text{C}$	65 $^{\circ}$ to 80 $^{\circ}\text{C}$	
Minimum return temperature	$^{\circ}\text{C}$	40 $^{\circ}\text{C}$	
Water system overheat cut-out temp.	$^{\circ}\text{C}$	110 $^{\circ}\text{C}$	
Burn-back overheat thermostat cut-out	$^{\circ}\text{C}$	60 $^{\circ}\text{C}$	
Electricity supply	-	230V~50Hz	
Max operating pressure - sealed system	bar	2.5 bar	
Max operating pressure - open system	bar	2.5 bar	
Maximum auger length (bulk hopper)	metres	6.0	
Maximum auger speed (bulk hopper)	rpm	30	
Minimum flue length	m	2.0	
Maximum flue length	m	12.0	
Heating element rating	Watts	450	
Intermediate auger motor power	Watts	55	
Intermediate auger motor starting current	Amps	0.64	
Intermediate auger motor running current	Amps	0.64	
Intermediate auger speed	rpm	8.1	
Flue fan motor power	Watts	32	
Flue fan motor starting current	Amps	0.27	
Flue fan motor running current	Amps	0.13	
Cleaning solenoid power	Watts	10	
Cleaning solenoid current	Amps	0.087	
Burner fan motor power	Watts	56	
Total burner start current	amp	2.5	
Total burner run current	amp	0.60	

2.2 Boiler Input and Output Data

The settings in the table below are based on the boiler using the Grant fixed angle pellet feed auger at 45° with an auger motor fixed speed of 8.1 rpm.

Only ENplus A1 (EN14961-2) pellets MUST be used with the Grant SPIRA boilers. These pellets must be bark and sand free AND approved by Grant UK BEFORE being used in the Spira boilers. Failure to use approved pellets will invalidate the product warranty.

2.2.1 Burner settings

All burner settings must be checked as part of commissioning and servicing. Refer to Section 9.6 for full details of the burner settings and how to access, check and, where necessary, how to adjust them.

Boiler and Hopper Weights

Model Number	Units	Spira Model	
		6-26	9-36
Weight boiler – less burner and fan box (empty)	kg	201	231
Weight burner	kg	25.5	25.5
Weight fan box	kg	5	5
Total weight of boiler (empty)	kg	231.5	261.5
Total weight of boiler (full)	kg	283	321.5
Weight 110kg pellet hopper (empty) – incl. auger	kg	41.35	41.35
Weight 110kg pellet hopper (full) – incl. auger	kg	151.35	151.35
Weight 200kg pellet hopper (empty) – incl. auger	kg	77	77
Weight 200kg pellet hopper (full) – incl. auger	kg	277	277
Weight of auger	kg	8.35	8.35
Weight 140kg double pellet hopper (empty) – incl. 2 augers	kg	42	42
Weight 140kg double pellet hopper (full) – incl. 2 augers	kg	182	182

2.3 Flue Gas Analysis

As part of both the commissioning and servicing procedures, the CO₂ content of the flue gases must be checked. To enable this to be done, the boiler is supplied with a combustion test point in the top rear cleaning door. Refer to Figure 10-17.

To gain access to this test point, first remove the top casing panel from the boiler. The test point should be at the back left corner of the rear cleaning door. If it is located at the front right corner of the cleaning door, then remove the door and refit it with the test point in the correct position.



NOTE

Use only a calibrated flue gas analyser with a 'Wood Pellet' fuel setting. Setting the fuel to anything other than wood pellets will give an incorrect reading.



CAUTION

Do not sample the flue gases through either the draught stabiliser, or from within the flue, as they will have been diluted with air entering through the draught stabiliser.

Only use the combustion test point in the top rear access door to check the CO₂ content of the flue gases. See Fig. 10-17.



CAUTION

To ensure correct combustion, the burner settings given in the table above must NOT be changed unless instructed to do so by Grant UK.

Model	Pellet feed Auger angle	MAX Flame								MIN Flame	
		Burner setting		Heat Output	Heat Input			Draught	CO ₂	Burner Setting	Heat Output
		TIME LOAD MAX	TIME PAUSE	kW (Btu/h)	kW (Btu/h)	Full Eff.	Input kg/hr*	mbar (in.wg)	%	TIME PAUSE MIN	kW (Btu/h)
SPIRA 6-26	45°	0025 (2.5sec)	0025 (2.5sec)	26.3 (89,735)	27.1 (92,500)	97.4	5.70	0.1–0.15 (0.04–0.06)	10–12	0140 (14.0sec)	6.5 (22,100)
SPIRA 9-36	45°	0065 (6.5sec)	0025 (2.5 sec)	36 (122,832)	38.7 (132,000)	93.1	7.78	0.1–0.15 (0.04–0.06 in.wg)	10–12	0250 (25sec)	9 (30,700)

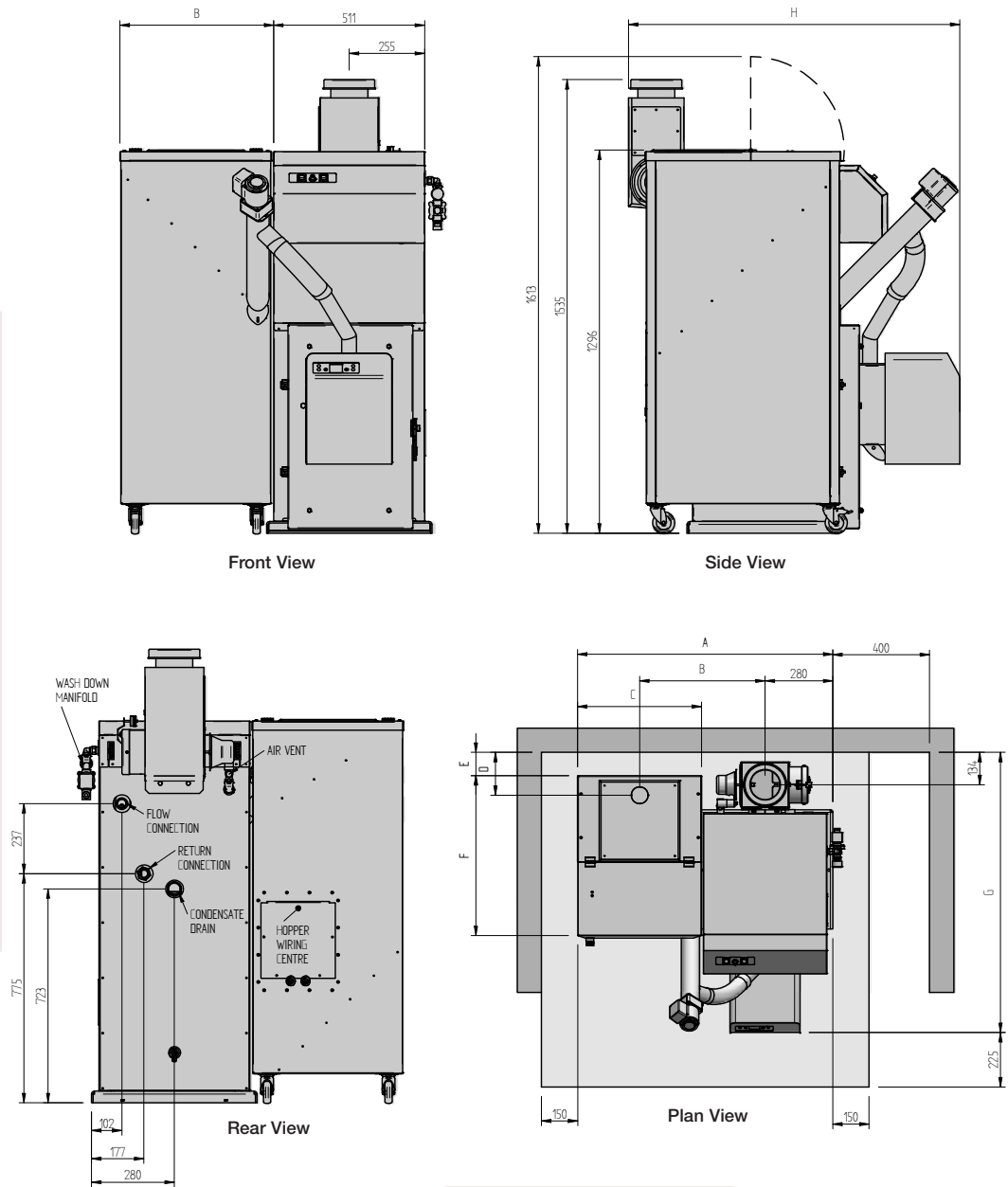
1. *Heat input is based on a calorific value of 4.81 kWh/kg.

2. Heat input and output data given above is approximate only.

2 Technical Data

2.4 Boiler and Hopper Dimensions and Clearances

2.4.1 Single Boiler with Left Hand Hopper

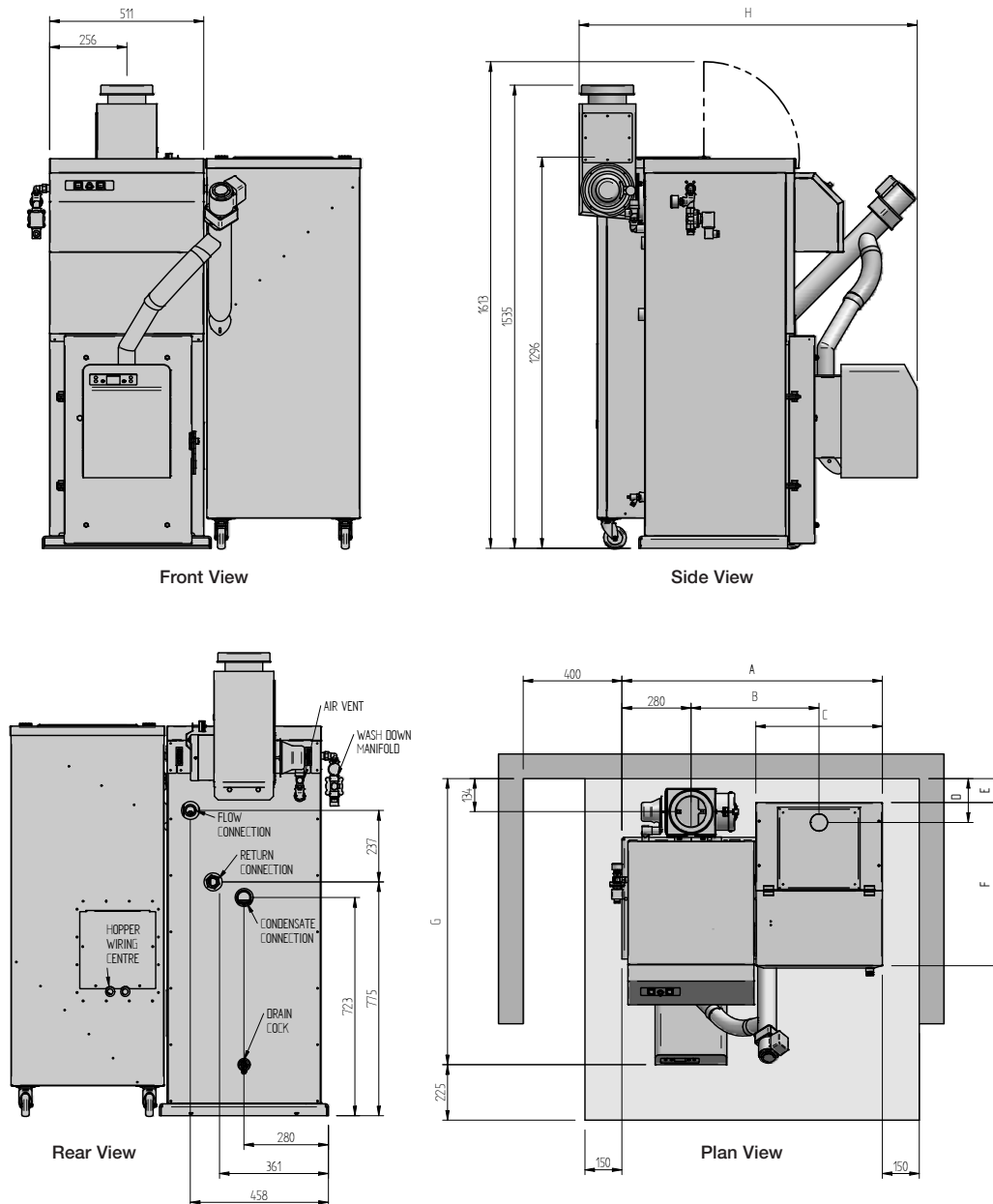


Spira Wood Pellet Boiler				Dimensions				
Model	A	B	C	D	E	F	G	H
6-26 110kg left hand hopper	1056	518	513	177	96	661	1160	1120
6-26 200kg left hand hopper	1256	618	713	125	44	713	1160	1120
9-36 110kg left hand hopper	1056	518	513	277	196	661	1260	1220
9-36 200kg left hand hopper	1256	618	713	225	144	713	1260	1220

If the measurement from the flue centre line to the rear wall is increased (shown as 134 in the plan view), then the dimensions D, E & G will have to be increased by the same increment. All units in millimeters

Figure 2-1: Boiler and hopper dimensions and clearances – single boiler with left hand hopper

2.4.2 Single Boiler with Right Hand Hopper



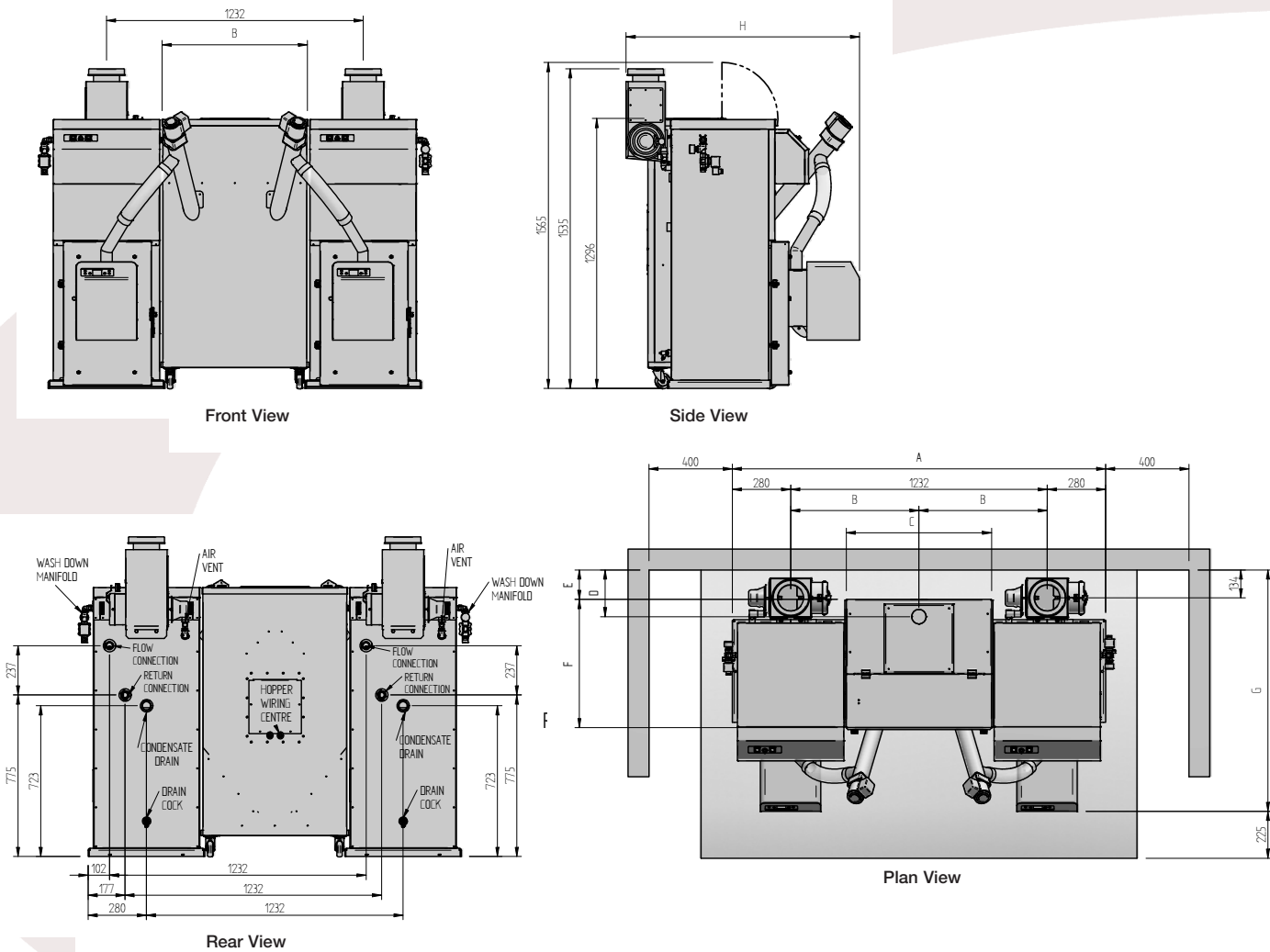
Spira Wood Pellet Boiler	Dimensions							
Model	A	B	C	D	E	F	G	H
6-26 110kg right hand hopper	1056	518	513	177	96	661	1160	1120
6-26 200kg right hand hopper	1256	618	713	125	44	713	1160	1120
9-36 110kg right hand hopper	1056	518	513	277	196	661	1260	1220
9-36 200kg right hand hopper	1256	618	713	225	144	713	1260	1220

If the measurement from the flue centre line to the rear wall is increased (shown as 134 in the plan view), then the dimensions D, E & G will have to be increased by the same increment. All units in millimeters

Figure 2-2: Boiler and hopper dimensions and clearances – single boiler with right hand hopper

2 Technical Data

2.4.3 Double Boiler with Central Hopper



Spira Wood Pellet Boiler				Dimensions				
Model	A	B	C	D	E	F	G	H
12-52 with double hopper	1792	616	697	224	141	616	1160	1120
15-62 with double hopper	1792	616	697	324	241	616	1260	1220
18-72 with double hopper	1792	616	697	324	241	616	1260	1220

If the measurement from the flue centre line to the rear wall is increased (shown as 134 in the plan view), then the dimensions D, E & G will have to be increased by the same increment. All units in millimeters

Figure 2-3: Boiler and hopper dimensions and clearances – double boiler with central hopper

3 Pellet Specification, Storage & Delivery

3.1 Pellet Specification

Grant SPIRA boilers are designed to run on EN Plus A1 wood pellets that comply with EN 14961 and meet the following of criteria:

Key Parameter	Limits	Category as per EN 14961
Diameter	6mm	D06,
Average length	$L < 5 \times \text{diameter}$	
Minimum and maximum length	3.15 to 40mm	
Moisture Content	<10%	S0.05
Mechanical durability	>97.5%	DU 97.5
Amount of fines	<1.0%	F1.0
Additives	None	
Nitrogen	<0.3%	N0.3
Nett calorific value	4.8 to 5.2 kWh/kg	
Bulk density	$\approx 650 \text{ kg/m}^3$	
Chlorine	<0.03%	CL 0.03

The following terms are commonly used when describing the properties of wood pellets:

Additives	Additives are used to improve the stability of the pellets. If manufactured correctly, and of a sufficiently low moisture content, quality pellets will require no additives.
Ash	Ash represents the non-combustible content of the pellet. Higher ash content reduces the calorific value of the pellet and requires the appliance to be cleaned more frequently.
Average Length	To provide a predictable flow of fuel into the burner, the recommended length of a pellet is deemed greater than 5mm and less than 5 times the diameter.
Bulk Density	Bulk density is the ratio between the weight of the pellet and the amount of space they take up. A good quality pellet will have a density of 650 kg/m^3 .
Chlorine	High levels of chlorine in the flue gases emissions can give rise to corrosion.
Diameter	The most common diameter is 6mm with some 8mm also available. This boiler is designed for 6mm only.
Fines	Pellets are made from compressed wood. As pellets rub together they can break down slightly, producing dust or fines. Too many fines indicate a poor quality pellet and can impede pellet flow in addition to causing dust problems when delivering and storing the pellets.
Mechanical Durability	This is a measure of how stable the pellet is and how likely it is to produce fines from normal handling. A high durability percentage is an indicator of a good quality pellet.
Moisture Content	Moisture affects the calorific value of the pellet. Low moisture content guarantees constant and predictable combustion efficiency. Higher moisture contents can result in pellet breakdown.
Net Calorific Value	This is the useful energy contained in a kilogram of fuel. This value is affected by the amount of non-combustible materials (ash) and the moisture content of the pellet. Typical values range from 4.8 kWh/kg to 5.2 kWh/kg.
Nitrogen	High levels of nitrogen in the flue gases emissions can give rise to corrosion.
Sulphur	High levels of sulphur in the flue gases emissions can give rise to corrosion.

3 Pellet Specification, Storage & Delivery

3.2 Pellet Storage

3.2.1 Pellet Hoppers & Pellet Feed Auger

All Grant SPIRA boilers are supplied with a pellet hopper. Refer to Section 1.4.4 for further details of the hoppers.

All Grant hoppers are supplied with either one or, on a double boiler hopper, two 1.2 m pellet feed augers, to deliver the pellets from the hopper to the boiler. Refer to Section 1.4.5.

The pellet hopper, along with the boiler (or boilers) it is supplying, **MUST** be installed in a dry indoor environment free from dampness. The hopper and boiler(s) must be located on the same floor level.

If a bulk hopper is to be used, there are two methods of transferring the pellets from the bulk store to the intermediate hopper:

- a) Via a bulk pellet feed auger
- b) Via the Grant SPIRA-VAC vacuum pellet feed system

All boiler pellet hoppers are supplied to accept either of these two pellet supply systems, as required. Refer to Section 1.4.4 for further details on the hoppers.

The electrical connections to the boiler(s) are all made to the 4-way electrical plug on one of the three factory-fitted 'flying leads' at the rear of the hopper. Refer to Section 7 for details.

Electrical connection for either a bulk auger or Grant SPIRA-VAC system, if required, is made using the 6-way electrical plug and flying lead supplied factory-fitted on the hopper.



Figure 3-1: Bulk auger inlet in hopper

3.2.2 Bulk Hopper

It is advisable to fit a bulk pellet store to take advantage of the lower cost of pellets purchased in bulk.

The pellet hopper must still be used, situated between the bulk hopper and the boiler, as the auger fitted to the hopper delivers the precise quantity of pellets required by the burner.

The pellet hopper also allows any problems with bulk pellet quality to be isolated and the intermediate hopper can be used temporarily as the source of pellets for the boiler.

It is essential to only use a bulk storage unit that is:

- a) Waterproof
- b) Specifically designed to store wood pellets
- c) Supplied with appropriate connections for pellet delivery, which are within the drivers reach
- d) Fitted with a vent connection (for dust extraction) during filling
- e) Permanently vented (if located outside) or unvented (if installed indoors)

- f) Fitted with a rubber arrester mat (or similar) to limit pellet damage during filling
- g) Is electrically earthed

A range of suitable bulk pellet stores are available from Grant UK. These are supplied flat packed for on-site assembly. Refer to assemble instructions supplied with each kit. For details of capacities and dimensions contact Grant UK.

The use of a self constructed wood pellet storage facility should be pre-approved by the fuel supplier before any pellets are delivered and must meet relevant building and fire regulations.

The ONORM M7137 standard should be used as a guideline for DIY bulk storage units.

A storage unit should not be positioned where it would result in a fire risk.

The store should be located on a suitable base (e.g. concrete) capable of supporting the weight of the store when full of pellets.



NOTE

Each bulk pellet supplier has clear guidelines on the requirements of a bulk storage hopper used to store their pellets, together with requirements on positioning, access, and minimum deliveries.

ALWAYS check with the pellet supplier you wish to use **BEFORE** installing a bulk storage system.

3.2.3 Bulk Pellet Feed Auger

When installing a bulk pellet store with a bulk pellet feed auger, consideration must be given to the position of the store in relation to the hopper as this will dictate the length of the auger.

The length of the pellet feed auger, supplying pellets from the bulk store, is limited to a maximum of 6 metres in length, as a longer auger can damage the pellets.

Grant UK offer a range of eight bulk pellet augers, from 2.5m to 6m in length in 0.5m steps, as given in the table below:

Product Code	Bulk Auger Length m	Auger Weight kg
WPAUG25	2.5m	21.3
WPAUG30	3.0m	24.1
WPAUG35	3.5m	26.9
WPAUG40	4.0m	29.7
WPAUG45	4.5m	32.5
WPAUG50	5.0m	35.3
WPAUG55	5.5m	38.1
WPAUG60	6.0m	40.9

To determine the length of auger required the following factors must be determined

- Difference in height between the ground/floor level (on which the store will stand) and the floor level (on which the hopper will stand).
- Horizontal distance between the back of the hopper and the store.

If the store is to be situated outside this will be

- the distance from the rear of the hopper to the inner face of the wall
- the thickness of the wall
- the distance to the store from the outside face of the wall.

Refer to Figure 3-3 for further details.

New dimensioned diagram of store & hopper here showing key dimensions



Figure 3-2: Bulk hopper feeding intermediate hopper

Figure 3-3: Bulk store and auger dimensions

Using the following table select the required length of auger based on the above dimensions. Always select the next size up of auger.

New table of store and bulk auger dimensions here

4 Boiler Installation Information

4.1 Introduction

For the 6-26 and 9-36 models, the appliance comes supplied on two pallets

- a) Pallet 1 contains the intermediate hopper and auger
- b) Pallet 2 contains the boiler, burner, and combined fan box & flue starter.

For the 12-52, 15-62 and 18-72 models ('double boiler' installations), the appliance comes supplied on two pallets

- a) Pallet 1 contains the intermediate hopper and augers
- b) Pallet 2 contains both boilers, each with burner and combined fan box & flue starter.

An accessories box is packed with each boiler and this contains the following:

- a) fan box (which comes complete with exhaust fan and draught stabiliser),
- b) condensate drain trap items
- c) wash pipe manifold assembly
- d) auger feed tube

Check the packing list (supplied in the accessories carton) to ensure all items have been delivered.

The Grant 'Black' flue system comes separately and its configuration will depend on the installation requirements.

4.2 Boiler Location

The boiler must be installed in a damp free environment.

Refer to Section 2.4 for boiler and hopper clearances. These clearances are to allow for access during servicing. Also if fitting a bulk hopper system refer to Section 3.2.2 as the location of the bulk hopper can influence the boiler location.

4.3 Preparation for Installation

With the units on the pallet, remove all outer packaging from the units. Unpack the accessories box supplied with the boiler and check the packing list against all items present.

4.4 Installing the Boiler

The boiler and hopper must be positioned on a level, solid, non-combustible base of at least 125mm thick. This must also extend past the boiler and hopper by 225mm at the front and 150mm on the remaining sides. The boiler position must comply with clearances shown in Section 2.4.

4.5 Regulations

Installation of a Grant SPIRA wood pellet boiler and hopper must be in accordance the following recommendations:

- National Building Regulations and any local Byelaws which you must check with the local authority for the area.
- Model and local Water Undertaking Byelaws.

The installation should also be in accordance with the latest edition of the following standards and codes of Practice;

- BS 715:2005 Metal flue pipes, fittings, terminals and accessories.
- BS EN 12828:2003. Heating systems in buildings. Design for water-based heating systems
- BS EN 12831:2003. Heating systems in buildings. Method for calculation of the design heat load.
- BS EN 14336: 2004. Heating systems in buildings. Installation and commissioning of water based heating systems.
- BS 7593:2006 Code of Practice for treatment of water in heating systems.
- BS 7671:2008 Requirements for electrical installations, IEE wiring regulations.
- ONORM M7137 standard should be used as a guideline for DIY bulk storage units.



NOTE

Failure to install and commission the appliance correctly will invalidate the boiler warranty.



WARNING

Before starting any work on the boiler or fuel supply please read the Health & Safety information given in Section 13.

4.6 Heating System Design Considerations

To achieve the maximum efficiency possible from the Grant SPIRA wood pellet boiler, the heating system should be designed to the following parameters:

Radiators

- Flow temperature 70°C
- Return temperature 50°C
- Differential 20°C

Size the radiators using a mean water temperature of 60°C.

Design system controls with programmable room thermostats, or use weather compensating controls, to maintain return temperatures below 55°C.



NOTE

The boiler should not be allowed to operate with a return temperature of less than 40°C when the system is up to operating temperature.

The use of a pipe thermostat is recommended to control the return water temperature when using weather compensating controls.

Underfloor Heating

- Flow temperature 50°C
- Return temperature 40°C
- Differential 10°C

In underfloor systems it is essential that the return temperature must be maintained at or above 40°C to prevent internal corrosion of the boiler water jacket.

4.7 Pipework Materials

Grant SPIRA boilers are compatible with both copper and plastic pipe. Where Plastic pipe is used it must be of the oxygen barrier type and be the correct class (to BS 7291: Part 1:2001) for the application concerned.

WARNING

On either sealed or open-vented systems; where plastic pipe is used a minimum of ONE metre of copper pipe **MUST** be connected between both the boiler flow and return connections and the plastic pipe. **DO NOT CONNECT PLASTIC PIPE DIRECTLY TO THE BOILER.**

Grant UK do not accept any responsibility for any damage, however caused, to plastic piping or fittings.

Sealed Systems

If plastic pipe is to be used, the installer must check with the plastic pipe manufacturer that the pipe to be used is suitable for the temperature and pressures concerned.

Plastic pipe must be Class S to BS 7291:Part1:2001.

WARNING

The system **MUST** incorporate a low-level pressure switch to shut off power to the boiler if the system pressure drops below 0.2 bar. A suitable low pressure switch kit is available to purchase from Grant UK – Part No. MPCBS62.

Refer to Figure 8.11 for the electrical connection details on this switch.

Underfloor Pipework

Plastic pipe may be used on underfloor floor systems where the plastic pipe is fitted after the thermostatic mixing valve.

Copper tube must be used for at least the first metre of flow and return primary pipework between the boiler and the underfloor mixing/blending valves.

4.8 Pipe Connections

Flow and return connections:

The flow and return connection are at the rear of the boiler (see Section 2.4) and the sizes are as follows;

SPIRA 6-26 Flow 1" BSP Female
Return 1" BSP Female

SPIRA 9-36 Flow 1" ¼ BSP Female
Return 1" ¼ BSP Female

Drain Cock:

Fit the ½" drain cock to the bottom rear ½" BSP connection. Fit the air vent assembly into the ½" connection on the rear of the boiler (this is to vent the secondary unit only), the flow pipe from the boiler must be vented.

Condensate Connection:

The 1¼" BSP female condensate outlet connection is located at the rear of the boiler. Refer to Section 5 for details on condensate connection and disposal pipework.

4.9 Wash System Manifold

The boiler is supplied with a cleaning manifold system to wash the condensing unit of any ash build up in the tubes.

NOTE

A minimum running (dynamic) pressure of 0.8 to 1.0 bar pressure (as shown on the gauge when the system is operating) is required to maintain an adequate supply for cleaning purposes.

The wash system manifold pipe is factory fitted through the right hand side of the boiler. This manifold pipe can be fitted in either one of two different positions, depending on the location of the pellet hopper, as follows:

With hopper located on the left side of the boiler - the wash system manifold if fitted from the right-hand side of the boiler, through the holes provided in the right hand side panel of the boiler and both sides of the heat exchanger chamber.

With hopper located on the right side of the boiler - the wash system manifold if fitted from the left-hand side of the boiler. A semi-pierced hole (provided in the left hand side panel of the boiler) must be pushed out to allow the manifold to be fitted from this side.

With hopper located between two boilers (in a 'double boiler' installation) - the right hand boiler will have the wash system manifold fitted from the right hand side and the left hand boiler will have the wash manifold fitted from the left hand side.

In all cases, ensure adequate clearance (minimum 400mm) is present for removal of the wash system during servicing. Refer to Section 2.4 for clearance dimensions.

The remainder of the washdown cleaning system consists of the pressure gauge and solenoid valve assembly, flexible hose, isolating valve (with integral check valve).

Fit the gauge/valve assembly to the end of the manifold pipe using the 22mm compression elbow.

Connect the mains water supply to the 15mm compression connection on the isolating/check valve inlet. Fit the flexible hose between the outlet of the isolating/check valve outlet and the inlet to the solenoid valve and leave in place.

NOTE

In hard water areas an anti-scale device should be fitted on the cold water supply to the wash system to prevent scale build-up in the manifold pipe and jets.

4.10 Fan Box and Flue Starter

Fit the fan box to the flanged flue outlet on the back of the boiler so that the flue starter outlet is at the top.

Remove the nuts and washers from the four studs around the fan box inlet. With the neoprene gasket in place on the fan box, locate the four studs through the corresponding holes in the boiler flue outlet flange. Secure the fan box using the nuts and washers previously removed.

Ensure that the fan box is vertical and the neoprene gasket is evenly compressed to give an adequate seal between the fan box and the boiler flange.

Fit the solenoid head (fitted to the same 5-way plug as the lead from the flue fan motor) on to the solenoid valve shaft and secure with the steel clip provided.

Fit the 5-way plug from the flue fan /solenoid valve into the socket at the top right rear of the boiler. Ensure that the plug is fully pushed home. See Figure 4-1.

4 Boiler Installation Information



Figure 4-1: Flue fan/solenoid valve plug connection

4.11 Pellet Hoppers

4.11.1 Single Boiler Installation

Position the pellet hopper on the same firm level surface as the boiler, on either the left-hand or right-hand side of the boiler (depending on hopper type used), with the top access door facing forwards. Refer to Figure 2-1 or 2-2 as required, for clearance dimensions.

4.11.2 Double boiler installation

Position the pellet hopper on the same firm level surface as, and in between, the two boilers, with the top access door facing forwards. Refer to Figure 2-3 for clearance dimensions.

Failure to adhere to these measurements can cause blockage of the pellets in the pellet delivery hose or can prevent access for servicing at a later date. The hopper is supplied with castors which allows the hopper be moved during servicing. Once in the correct position, engage the brakes on the front casters to maintain this position.

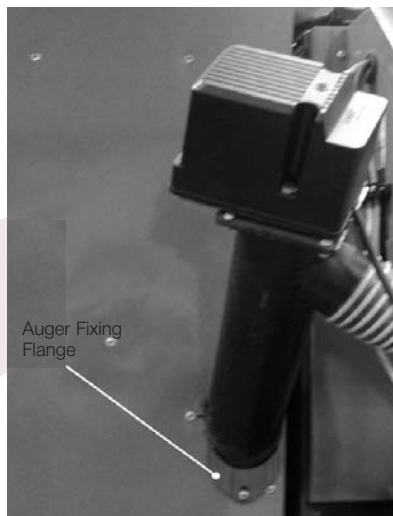


Figure 4-2: Pellet feed auger fixing

4.12 Pellet Feed Auger

4.12.1 Single Boiler Hoppers

The pellet feed auger is supplied packed with the hopper but not factory-fitted to it.

To fit, unpack the hopper and auger. Remove the M5 screw fitted below the auger opening on the front of the hopper. Fit the end of the auger into opening in the front of the hopper as far as it will go and secure by fitting the M5 screw through the auger fixing flange and tighten. See Figure 4-2.

4.12.2 Double Boiler Hoppers

Both augers on the 'double boiler' Intermediate hoppers are supplied factory-fitted to the hopper.

To connect the hopper to the boiler, fit one end of the pellet delivery hose onto the pellet feed auger outlet and the other end onto the burner feed tube. The pellet delivery hose may need to be cut if too long. A sachet of lubricant is supplied in the accessories carton; apply the lubricant to the joint to ensure the pellet delivery hose is easily fitted. Ensure the pellet delivery hose is not kinked in any way.

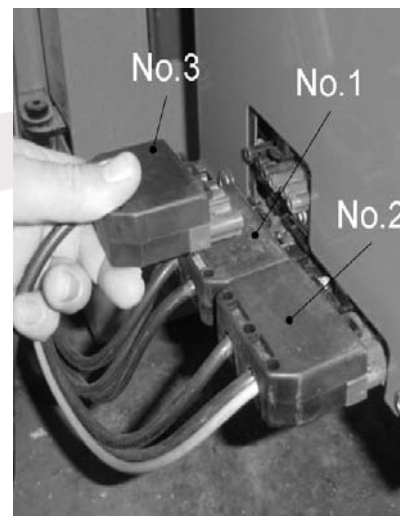


Figure 4-3: Auger plug connection

Fit the 6-way plug (No.3), from the pellet feed auger motor, into the corresponding 6-way socket on the left side of the burner. Ensure that the plug is fully pushed home until the small catch it clicks into place. See Figure 4-3. Refer to Section 8.3 for all boiler plug connections.



WARNING

Ensure the pellet delivery hose forms an air tight seal at each end and that the pellet delivery hose is not damaged. Leakage of air could cause increased temperature in the pellet delivery hose and result in the pellet feed tube (burn back) thermostat operating and shutting down the burner.

4.13 Before you Commission

To avoid the danger of dirt and foreign matter entering the boiler the complete heating system should be thoroughly flushed out – both before the boiler is connected and then again after the system has been heated and is still hot.

This is especially important where the boiler is to be installed on an old system.

For optimum performance after installation, the boiler and the associated heating system must be flushed in accordance with the guidelines given in BS 7593:1992 'Treatment of water in domestic hot water central heating systems'. This must involve the use of a proprietary cleaner, such as Betz Dearborn's Sentinel x300 or x400, or Fernox Restorer. Full instructions are supplied with the products but for more details visit either www.sentinel-solutions.net for Betz Dearborn products or www.fernox.com for Fernox products.

After flushing the system, an inhibitor such as Sentinel X100 or Fernox MB-1 should be used in accordance with the guidelines given in BS 7593:1992 for long term protection against corrosion and scale,

Grant UK strongly recommend that a magnetic in-line filter is fitted in the heating system pipework. A magnetic in-line filter must be fitted in the heating system pipework. This should be installed and serviced in accordance with the filter manufacturer's instructions.

4.14 Completion

Please ensure that the Grant SPIRA Commissioning form (supplied with the boiler) is completed in full and that it is signed by the householder/user.

Leave the White copy with the user, retain the Pink copy for your own records, and return the Yellow copy to Grant UK to register the installation of the boiler.

Ensure that the User Information pack (supplied with the boiler) is handed over to the householder along with this Installation and Servicing manual.

5 Condensate Disposal

5.1 General Requirements

When in condensing mode the Grant SPIRA condensing wood pellet boilers produce condensate from the water vapour in the flue gases. This condensate is slightly acidic with a pH value of around 6. Provision must be made for the safe and effective disposal of this condensate.

Condensate can be disposed using one of the following methods:

- Into a soil stack – either directly or via an existing waste system.
- Into an external gulley.
- Into a purpose made soakaway.

All condensate disposal pipes must be fitted with a trap whether they are connected internally or externally to a domestic waste system/soil stack or run externally to a gully, hopper or soakaway. Every Grant SPIRA boiler is supplied with a trap and this **MUST** be used. Refer to Section 5.6 for trap details.

5.2 Connections

Connections into a rainwater hopper, external drain or gulley should be terminated inside the hopper/drain/gulley below the grid level but above the water level.

Condensate disposal pipes **must not** be connected directly into rainwater downpipes or to waste/soil systems connected to septic tanks.

Condensate **must not be discharged** into 'grey water' systems that re-use water used in the home (not including water from toilets).

It should be noted that connection of a condensate pipe to the drain may be subject to local Building Control.

5.3 Pipework

Condensate disposal pipework must be plastic. **Copper or steel pipe is not suitable and must NOT be used.**

All condensate disposal pipes connected to a Grant SPIRA boiler must have a minimum 'nominal' diameter of 38mm (1 ½") plastic pipe.

Condensate disposal pipes should be kept as short as possible and the number of bends kept to a minimum.

Pipes should be adequately fixed to prevent sagging, i.e. at no more than 0.5 metre intervals.

Condensate disposal pipes must be fitted with a fall (away from the boiler) of at least 2.5° (~45mm fall per metre run).



NOTE

Where it is not possible for the pipe to fall towards the point of discharge –either internally into a waste system or externally to a gulley (e.g. for boilers installed in a basement), it will be necessary to use a condensate pump.

When using a condensate pump with a Grant SPIRA boiler, a condensate holding tank of at least 40 litres is required. This is to ensure that when the boiler cleaning cycle has operated the holding tank can collect the total volume of the water used in the wash down and the condensate pump can then discharge the waste water effectively.

A boiler interlock should be fitted to shut off the boiler in the event of a malfunction of the condensate pump.



WARNING

When using a condensate pump and holding tank, the burner settings for 'TIME CLEAN PERIOD' (time boiler cleaning is in operation) must not be set greater than 600 (60 seconds) and the 'TIME CLEAN BOILER' (time between boiler cleaning operations) must not be set less than 180 minutes, as modifying these times could result in larger and more frequent wash down of the boiler which could exceed the capabilities of the tank and condensate pump. Refer to Section 8 for further details of the burner settings.

5.4 External Pipework

Ideally, external pipework, or pipework in unheated areas, should be avoided. If unavoidable, external pipework should be kept as short as possible (less than 3 metres) and 38mm (1 ½") waste pipe used to minimise the risk of ice blocking the pipe in freezing conditions.

The number of bends, fitting and joints on external pipes should be kept to a minimum to reduce the risk of trapping condensate.



NOTE

For a boiler installed in an unheated area such as an outhouse or garage, all condensate pipework should be considered as an 'external'.

5.5 Condensate Soakaway

To keep external pipework to a minimum, locate the soak away as close as possible to the boiler but ensure it is at least 1 metre from building foundations and away from other services, for example gas, electricity or other services.

The condensate pipe may be run above or below ground level and can enter either the top or side of the soakaway tube. Refer to Figure 5.1.

Ensure that the drainage holes in the soakaway tube face away from the building.

Backfill the soakaway tube, and the hole around it, with 10mm limestone chippings.

Only use a soakaway where the soil is porous and drains easily.

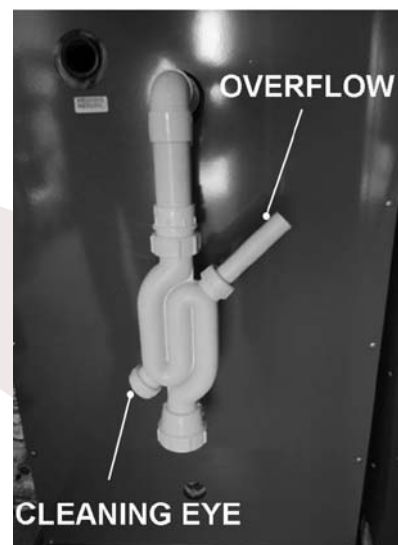
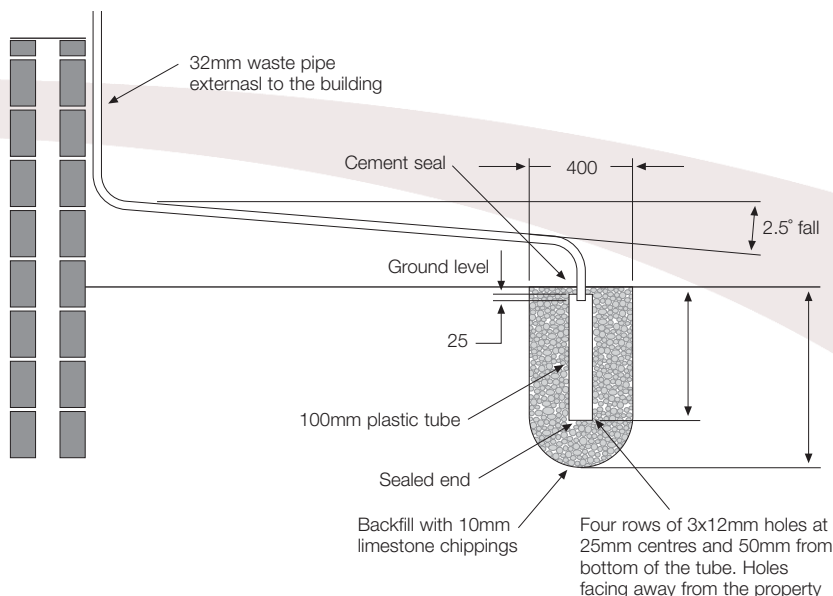


Figure 5-1: ????

Figure 5-1: Purpose made condensate soakaway

5.6 Condensate Trap

Grant SPIRA condensing boilers are supplied with condensate trap. This trap must be used. No alternative trap should be used in place of the trap supplied with the boiler. The 1½" BSP female condensate outlet connection is located at the rear of the boiler.

Fit the 1½" 311 fitting (supplied) into this connection. Using the elbow and pipe (supplied), connect the trap to the condensate outlet on the boiler, as shown in Figure. 5-2.

A condensate discharge pipe with a minimum diameter of 38mm (1½") must be fitted to the outlet connection at the base of the trap.

In all cases the overflow pipe (see Figure 5-2) must be fitted to the trap and the end left open. This will protect the boiler from becoming blocked with condensate in the event of the condensate discharge pipe blocking or frozen.



CAUTION
All condensate pipework must be adequately protected against freezing, however if the condensate pipe is frozen, water will build up and discharge through the overflow on the trap.

If connecting the condensate discharge into a waste system or soil stack, either internally or externally, a second trap must be fitted in the condensate discharge pipe. This trap must provide the required 75mm water seal. It must be located between the boiler condensate trap and the connection to the soil stack, in a position accessible for checking and cleaning.

5.7 Inspection and Cleaning of Trap

The boiler condensate trap (and any second trap fitted) must be checked at regular intervals (e.g. on every annual service) and cleaned as necessary to ensure it is clear and able to operate.



CAUTION
Failure to regularly check and clean the condensate trap (or traps) may result in damage to the boiler and this will not be covered by the product warranty.

6 Sealed Systems

6.1 Sealed System Requirements

All Grant Spira boilers are suitable for use with sealed systems complying with the requirements of BS5449.

The system must be provided with the following items:-

- Diaphragm expansion vessel complying with BS 4814.
- Pressure gauge.
- Pressure relief (safety) valve.
- Approved method for filling the system.

Expansion vessel



NOTE

Ensure that the expansion vessel used is of sufficient size for the system volume.

Refer to BS 7074:1:1989 or The domestic Heating design Guide for sizing the required vessel.

The expansion vessel can be fitted in either the return or flow pipework in any of the recommended positions as shown in Figure 6-1. To reduce the operating temperature of the expansion vessel diaphragm, position it below the pipe to which it is connected.

The expansion vessel may be positioned away from the system, providing the connecting pipe is not less than 13 mm diameter. If the expansion vessel is connected via a flexible hose, care must be taken to ensure that the hose is not twisted.

The pressure gauge must have an operating range of 0 to 4 bar.

It must be located in an accessible place next to the filling loop for the system

Safety Valve

The safety valve (provided with the boiler) is set to operate at 2.5bar. It should be fitted in the flow pipework near to the boiler.

The pipework between the safety valve and boiler must be unrestricted, i.e. no valves. The safety valve should be connected to a discharge pipe which will allow the discharge to be seen, but cannot cause injury to persons or property.

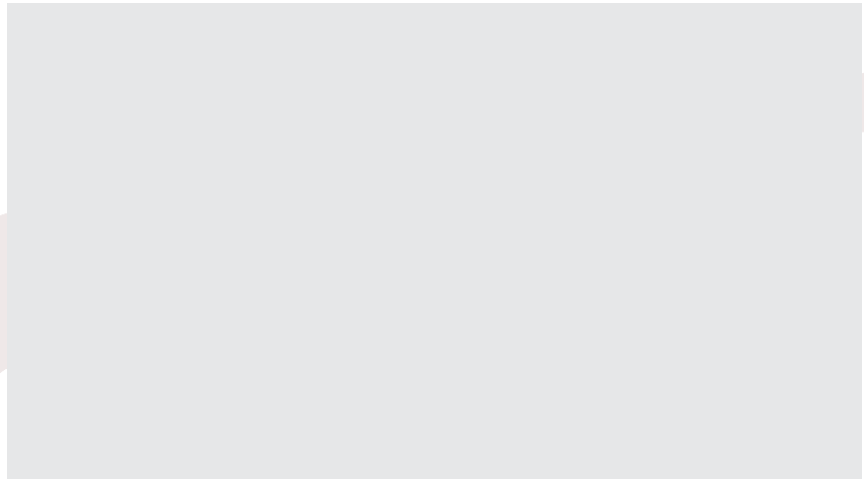


Figure 6-1: Sealed heating system components

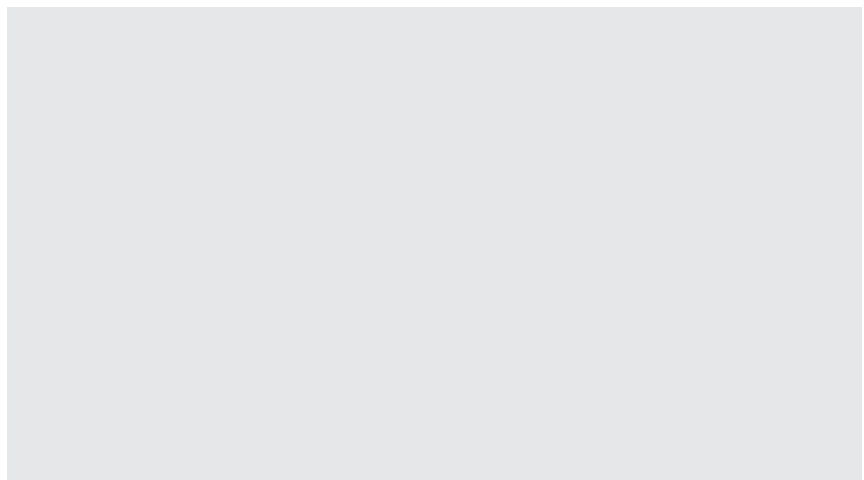


Figure 6-2: Heating system Pressure Gauge

Filling Loop

Provision should be made to replace water lost from the system. This can be done manually (where allowed by the local water undertaking) using an approved filling loop arrangement incorporating a double check valve assembly.

The filling loop must be isolated and disconnected after filling the system.

Heating System

The maximum temperature of the central heating water is 75°C. Refer to Section 1.1.

An automatic air vent should be fitted to the highest point of the system.

If thermostatic radiator valves are fitted to all radiators, a system by-pass must be fitted. The by-pass must be an automatic type.

All fittings used in the system must be able to withstand pressures up to 3 bar. Radiator valves must comply with the requirements of BS 2767(10):1972.

One or more drain taps (to BS 2879) must be used to allow the system to be completely drained.

6.2 Filling the Sealed System

Filling of the system must be carried out in a manner approved by the local Water Undertaking.



WARNING

Only ever fill or add water to the system when it is cold and the boiler is off. Do not overfill.

The procedure for filling the sealed system is as follows:

1. Check the air charge pressure in the expansion vessel **BEFORE** filling the system.

! NOTE

The air charge pressure may be checked using a tyre pressure gauge on the expansion vessel Schraeder valve. The vessel may be re-pressurised, when necessary, using a suitable pump. When checking the air pressure, the water in the heating system must be cold and the system pressure reduced to zero.

The expansion vessel charge pressure should always be slightly greater than the maximum static head of the system, in bar, at the level of the vessel (1 bar = 10.2 metres of water). See Figure 6-2.

The charge pressure must not be less than the actual static head at the point of connection.

2. Check that the small cap (or screw) on all automatic air vents (including the one fitted at the left rear of the boiler) is open at least one turn. The cap (or screw) remains in this position from now on.
3. Ensure that the flexible filling loop is connected and that the double check shut off valve connecting it to the water supply is closed. A valve is open when the operating lever is in line with the valve, and closed when it is at right angles to it.
3. Open the fill point valve.
4. Gradually open the double check valve from the water supply until water is heard to flow.
5. When the needle of the pressure gauge is between 0.5 and 1.0 bar, close the valve.
6. Vent each radiator in turn, starting with the lowest one in the system, to remove air.

7. Continue to fill the system until the pressure gauge indicates between 0.5 and 1.0 bar. Close the fill point valve. The system fill pressure (cold) should be 0.2 - 0.3 bar greater than the vessel charge pressure – giving typical system fill pressures of approx 0.5 bar for a bungalow and 1.0 bar for a two storey house. Refer to the Domestic Heating Design Guide for further information if required.
8. Repeat steps 5 and 6 as required until system is full of water at the correct pressure and vented.
9. Water may be released from the system by manually operating the safety valve until the system design pressure is obtained.
10. Close the fill point and double check valves either side of the filling loop and disconnect the loop.
11. Check the system for water soundness, rectifying where necessary.

6.3 Venting the Pump

It is important that the pump is properly vented to avoid an air lock and also prevent it running dry and damaging the bearings.

Unscrew and remove the plug from the centre of the pump motor.

Using a suitable screwdriver, rotate the pump spindle about one turn.

Replace the plug in the motor. Do not overtighten.

6.4 Pressure Relief (Safety) Valve Operation

Check the operation of the pressure relief (safety) valve as follows:

1. Turning the head of the valve anticlockwise until it clicks. The click is the safety valve head lifting off its seat allowing water to escape from the system.
2. Check that the water is escaping from the system.
3. Top-up the system pressure, as necessary.

! NOTE

The expansion vessel air pressure, system pressure and operation of the pressure relief valve must be checked on an annual service. Refer to Section 11.

7 Flue System and Air Supply

7.1 Air Supply

The Grant SPIRA wood pellet boiler draws air for combustion from the room in which it is located.

Any such room or space containing an appliance must have sufficient permanent air supply to the boiler

- To ensure correct combustion of the fuel and effective operation of the flue system (i.e. to discharge of combustion products to the open air).
- To supply enough free air to the draught stabiliser.

The ventilation area provided must be in accordance with the requirements of The Building Regulations Approved Document J – Section 2: Appliances burning solid fuel.

For a boiler with a draught stabiliser, a permanent air vent with a total free area of at least 850mm² per kW of appliance rated output is required. To achieve this, the following minimum vent opening areas are required:

Boiler Model	Minimum Vent Open Area
Grant SPIRA 6-26	221cm ² (35in ²)
Grant SPIRA 9-36	306cm ² (48in ²)
Grant SPIRA 12-52	442cm ² (70in ²)
Grant SPIRA 15-62	527cm ² (83in ²)
Grant SPIRA 18-72	612cm ² (96in ²)

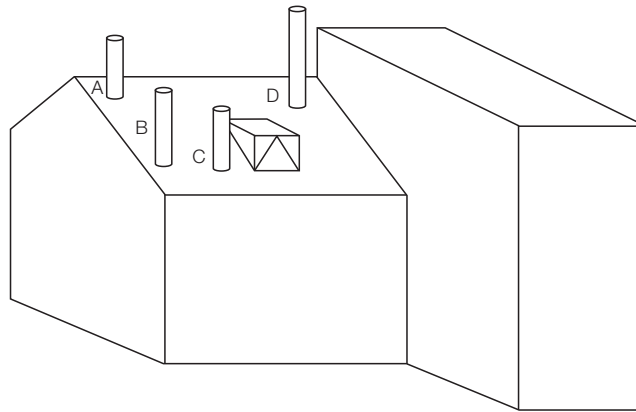
If a bulk pellet store is fitted internally, refer to the manufacturer's instructions for any ventilation requirements.

7.2 Flue Position and Clearances

The Grant Spira wood pellet boilers have high operating efficiencies and low flue gas temperatures. **Only the Grant 'BLACK' insulated twin-wall flue system must used with the Grant SPIRA boilers.**

- The flue terminal should be located in a downdraught free area, i.e. above the roof, where it can discharge freely and not present a fire hazard whatever the wind conditions.

- The flue outlet positions shown in Figure 7-1 (taken from Approved Document J – Section 2) can meet the above requirement.
- The heights and separation distances shown in Figure 7-1 may have to be increased in particular cases, e.g. where high wind exposure, surrounding tall buildings, or adjacent trees can cause adverse wind effects.
- The boiler flue cannot terminate into an existing brick or clay lined chimney. All masonry flues must be lined using the Grant Black system stainless steel flexible flue liner.
- No other appliance can be connected to the boiler flue.
- The minimum clearance between the outer flue surface and any combustible material is 60mm.
- Any condensate in the flue can run back into the boiler. A condensate drain at the base of the flue system is not required.



Point where flue passes through weather surface (Note 1,2)	Clearance to flue outlet
A At or within 600mm of the ridge	At least 600mm above the ridge
B Elsewhere on a roof (whether pitched or flat)	At least 2300mm horizontally from the nearest point on the weather surface and; a; at least 1000mm above the highest point of intersection of the chimney and the weather surface; or b; at least as high as the ridge
C Below (on a pitched roof) or within 2300mm horizontally to an openable rooflight, dormer window or other opening (Note 3)	At least 1000mm above the top of the opening
D Within 2300mm of an adjoining building, whether or not beyond the boundary (Note 3)	At least 600mm above the adjacent building

Notes

- The weather surface is the building external surface, such as its roof, tiles or external walls.
- A flat roof has a pitch less than 10°.
- The clearance given for A or B, as appropriate, will also apply.

Figure 7-1: Flue terminal positions

The above clearances are as specified in Building Regulations Approved Document J. Also refer to Approved Document J of either the England and Wales or Irish building regulations for further requirements on the installation of flue systems for solid fuel appliances.

7.3 Flue System Assembly

7.3.1 Fan Box & Flue Starter

The fan box supplied with the boiler (packed in the accessories carton) incorporates:

- Flue exhaust fan
- Draught stabiliser
- Flue starter connection (to fit Grant 'Black' flue system)
- Clean out hatch

The fan box is supplied with a neoprene gasket for connection to the boiler. This neoprene gasket is to accommodate the low temperature wet flue system of the Grant SPIRA boilers. Refer to Section 4.15 for fitting details.

The lead for the flue fan (supplied factory-fitted to the fan box) is connected to the same 5-way plug as the lead for the wash system solenoid valve. Refer to Section 4.15 for connection details.

When fitting the flue system to the flue starter connection, on the fan box, the lip seal supplied with the flue component must be fitted to the inner flue liner, and the locking band fitted to secure the joint.

When installed, the draught stabiliser must not be boxed in or obstructed from operation in any way.

The clean out hatch allows access to the inside of the fan box for inspection and, where necessary, removal of any ash that may have dropped down inside the flue system. The clean-out hatch MUST be correctly fitted during normal boiler operation. See Section 10 - Servicing.

A condensate drain at the base of the flue is not required as the flue system is designed to allow the condensate to run back into the boiler.

7.3.2 Flue System

The Grant 'Black' flue system is a fully insulated stainless steel twin-wall flue - finished with a Black Polyester Powder paint finish. This insulated flue system reduces the possibility of the condensate freezing in the flue, and also has a high corrosion resistance suitable for solid fuel.

The 125mm (5in) 'Black' twin-wall flue system is suitable for BOTH the SPIRA 6-26 & 9-36 models.

Masonry chimneys MUST be lined using the 125mm stainless steel flexible 'smoothbore' liner - available as part of the 'Black' system - due to the condensate produced from the boiler.



NOTE

The Grant BLACK flue system is the ONLY flue system suitable for use with the Grant SPIRA Wood pellet boilers. The use of other flue systems will invalidate the product warranty on the boiler.

6.3.3 Joining Components

All the 'Black' system twin-wall flue components (with the exception of the elbows) use a 'twist lock' jointing system.

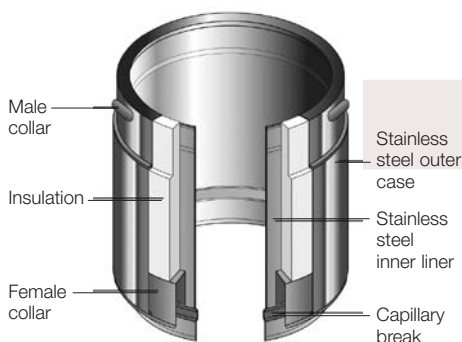


Figure 7-2: Male and female flue connections

The 'male collar' end of the flue component MUST always be uppermost when fitted.

To join two components together:

First fit the lip seal supplied into the groove (in the inner flue liner) at the 'female collar' end of the flue component to be fitted.

All flue joints must have a lip seal gasket fitted. The lip seal should be fitted dry and the lubricating grease (supplied with the component) applied to the internal surface of the socket into which it is to be fitted.

Loosen the locking band at the 'female collar' end. Insert the 'male collar' into the 'female collar' and twist through 1/6 of a turn to lock in place. Refer to Figure 7-3.

7 Flue System and Air Supply



Figure 7-3: Twist lock joint between components

Ensure that the two beaded ends of the flue components are in contact with each other all round. Position the locking band so that it grips the beaded edge of both components and fasten using the spring clip. The locking bands provided **MUST** be fitted at **ALL** flue joints. Refer to Figure 7-4.

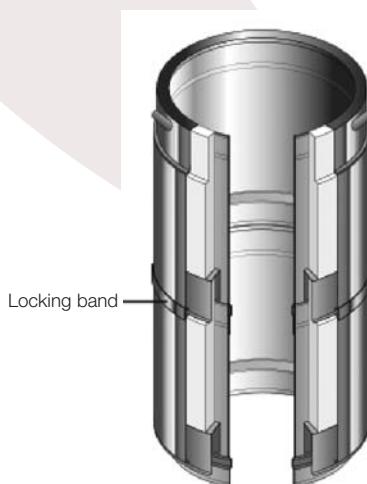


Figure 7-4: Fitting of locking band

To allow for alignment, the female collars of the elbows do **NOT** have the twist lock flutes, but the locking band **MUST** still be used to secure the two flue components together.

To temporarily assemble the flue system components, to check component lengths, alignment of connections, etc. **DO NOT** fit the lip seals. However, for **FINAL** assembly the lip seals provided **MUST** be fitted at **EVERY** joint.



WARNING

All joints in the flue system must be accessible for inspection. No joints should be located within a wall, floor or ceiling spaces or any other inaccessible place.

7.3.4 Adjustable Length

The Grant 'Black' flue system includes an Adjustable flue extension. Refer to Section 7.6. This allows any of the straight flue extension components to be extended in length by between 75mm to 250mm.

This adjustable extension must be used in conjunction with any straight extension (1000mm, 500mm or 333mm) to achieve the actual straight length required.

To fit the adjustable extension, first remove insulation from between the inner and outer walls of the component, as necessary. Fit the open end over the 'male collar' end of the fixed extension and adjust to achieve the required overall length. Secure the two components together using the wide locking band supplied.



NOTE

The adjustable section is not load-bearing, therefore adequate support of the flue system MUST be provided immediately above the adjustable extension.

7.3.5 Support Components

The weight of the flue system is considerable. It must **NOT** be carried by the fan box fitted to the appliance, but requires independent support.

Support Plate

On internal systems, the weight can often be supported where the flue passes through an upstairs floor, using the Support Plate with clamp band

(Grant ref. WP/SP). A four-sided square opening, formed by timber stringers between the joists, is required to support the plate. Ensure that the minimum distance of 60mm is achieved between the flue outer surface and the any combustibles (e.g. timber joists).

A Fire Stop plate (Grant ref. WP/FP) is also required to be fixed to the ceiling below.

When passing through a second upstairs floor (in a 3-storey house) either a second support plate can be fitted or only two fire-stop plates (one above and one below) need be fitted as the flue is adequately supported at the first upstairs floor level.

Intermediate Top Plate

Flue systems running up against either an internal or external wall surface can be supported using the Intermediate Top Plate (Grant Ref. WP/TP). This is mounted on a pair of Wall Support Side Plates (Grant Ref. WP/WS), which are fastened to the wall, to provide support at either the base, or part way up, a vertical section of flue.

The 'female collar' (on the underside of the plate) is fitted into the flue below and the 'male collar' (on the upper side of the plate) is a twist-lock connection into the flue above. Both joints are secured using the clamp bands provided.

Wall and Roof Brackets

Both the Wall bracket (Grant ref. WP/WB50) and the Adjustable Wall Bracket (Grant ref. WP/WB300) are **NOT** load bearing and are designed to give lateral support only. Wall brackets should be fitted with a maximum spacing of 3m on straight runs of flue and at any offset to ensure the system is rigidly supported.

Similarly, the Roof Support Band (Grant ref. WP/RS) is not load bearing and is designed to give lateral support only.

Where the flue is free standing above the roof and its height exceeds 1.5m beyond the last support of the roof (e.g. Roof Support Band) a Guy Wire Bracket (Grant ref. WP/GB) **MUST** be used and at every 1.5m thereafter. Grant do not supply the guy wires or tie rods to use with this bracket.

Extended Locking Band

A height of up to 3m above the last support at the roof can be achieved, without the need for guy wires, by using an extended locking band (Grant ref. WP/LBEXT) at the joint immediately below, and at every joint above, the last flue support.

7.3.6 Elbows

Two elbows are available - 30° and 45°.

To allow for alignment, the female collars of these elbows do NOT have the twist lock flutes, but the locking band MUST still be used to secure the two flue components together.

The Building Regulations Approved Document J requires a flue system to have the means to be inspected and cleaned as required.

To allow for this there should be no more than 2 elbows – of maximum angle 45° from the vertical – fitted between the boiler fan box (clean out hatch) and the terminal.

This can be increased to a maximum of four elbows (maximum 45°) between the boiler and terminal if there is an inspection hatch between the second and third elbows. An Inspection Pipe incorporating an inspection hatch (Grant ref. WP/IP) is available as part of the Grant 'Black' flue system.

Any Inspection hatch must be accessible for checking and cleaning purposes.



Failure to maintain a clean flue can result in the emission of flue gases into the dwelling or damage from fire in the flue. See Section 11.4 Cleaning the Boiler & Flue.



No horizontal section or no bend greater than 45° should be used as these can cause a build up of ash and condensate in the flue.

7.3.7 Wall Sleeves

In accordance with the Building Regulations Approved Document J, a wall sleeve should be used where the flue system passes through a wall. A suitable wall sleeve is available as part of the Grant 'Black' flue system. This 45° angled wall sleeve gives a 60mm clearance all round from the outer surface of the flue passing through it. The sleeve is 45° mitred at one end. The other end of the sleeve should be cut on site to the correct length, to leave it flush with the wall on both sides. The gap between the sleeve and flue should be adequately weatherproofed using a good quality mastic and fibre rope.

7.4 Flue Notice Plate

The Building Regulations Approved Document J requires a notice plate that conveys essential information regarding the flue installed to be permanently displayed. A suitable self adhesive notice plate is supplied with the Grant Black flue system and this must be completed by the installer and displayed in an unobtrusive but obvious position within the building concerned, e.g. next to the flue system/boiler.

7.5 Carbon Monoxide Alarm

The Building Regulations Approved Document J requires a Carbon Monoxide alarm to be fitted in the room where the boiler is located.

This should be positioned between 1 and 3m horizontally from the boiler either:

- a) on the ceiling at least 300mm from any wall, or
- b) on a wall as high up as possible (above any windows or doors) at least 150mm from ceiling.

7 Flue System and Air Supply

7.6 Flue System Components



WPADJ 250 EXT 250



WPEXT333 Extension 333mm
WPEXT500 Extension 500mm
WPEXT1000 Extension 1000mm



WP45 45° Bend



WP30 30° Bend



WP01 Locking band



WPFP Firestop plate 2PC



WPWB50 50mm Wall bracket



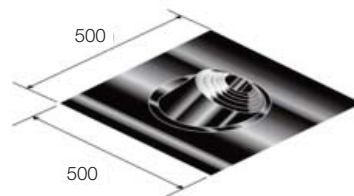
WPWB300 300mm Wall bracket



WPRS Roof support band



WPRC Rain Cap



WPUF 200 Uni flash



WPSC Storm collar



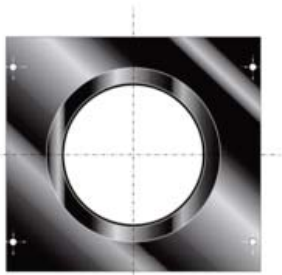
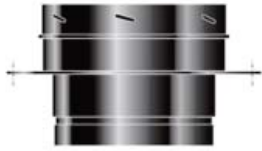
WPGB Guy wire bracket



WPSP Support plate 2pc



WPTP Intermediate top plate



WPAP
Anchorplate to chimflex adaptor



WPWS Wall support plate



WPCA ICID to chimflex adaptor

7 Flue System and Air Supply

7.7 Flue Component Dimensions

revised drawings to come



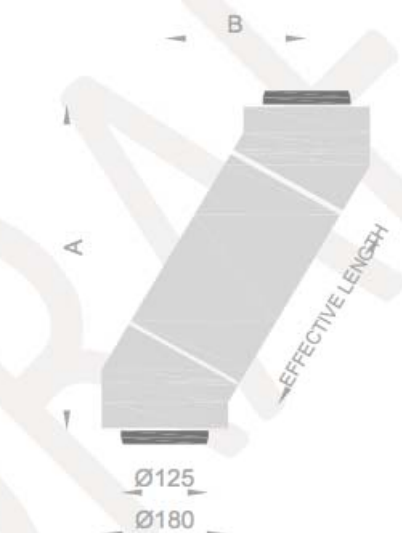
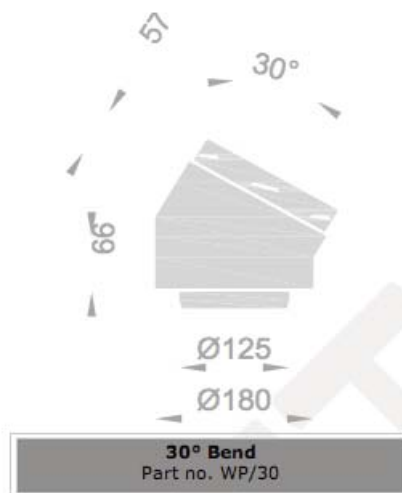
Straight Pipe Length (mm)		
Nominal Length	Effective Length (mm)	Part Number
1000	960	WP/EXT1000
500	460	WP/EXT500
333	293	WP/EXT333
200	160	WP/EXT200



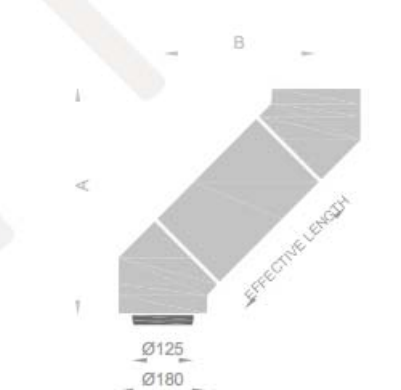
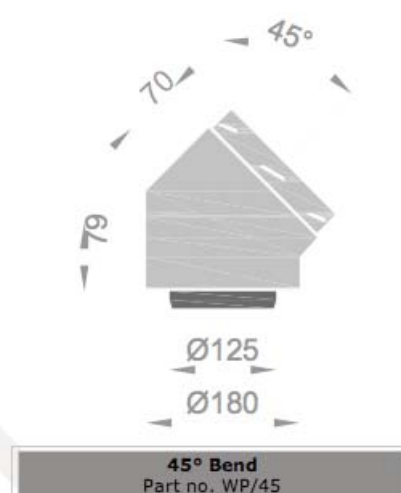
Adjustable Pipe 75 - 250mm
Part no. WP/ADJ250

Complete with locking band.
Telescopes over pipe below.
Minimum engagement should be half the diameter.

This component is NOT load-bearing.



Double 30° Bend and Straight Pipe Length (mm)		
Effective Length	Dimension	Length
960	A	1061
	B	542
460	A	628
	B	292
293	A	483
	B	208
160	A	368
	B	142



Double 45° Bend and Straight Pipe Length (mm)		
Effective Length	Dimension	Length
960	A	933
	B	784
460	A	580
	B	431
293	A	462
	B	313

7.8 Typical Flue Systems

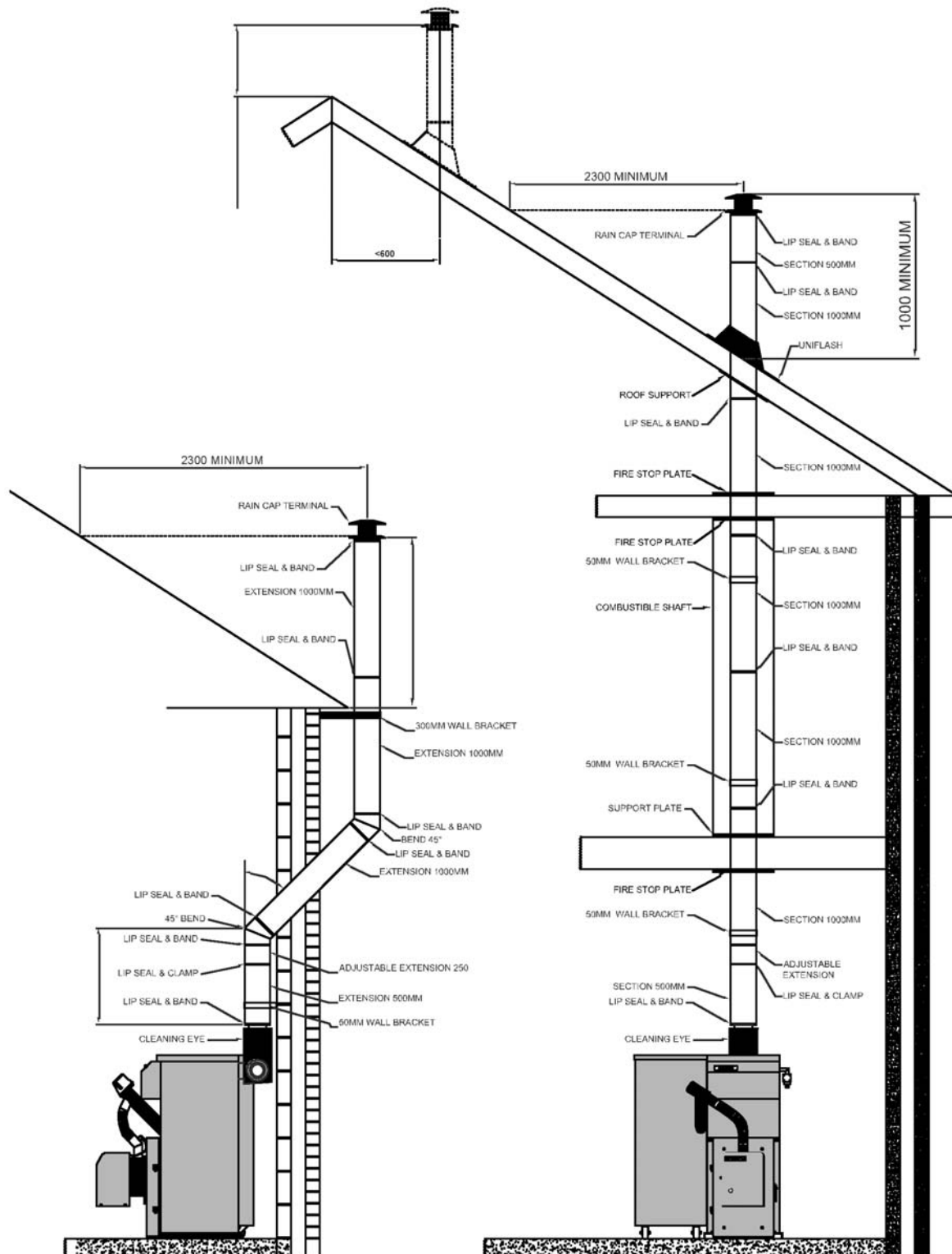


Figure 7-5: Typical flue installations details

8 Electrical

8.1 General Requirements

The Grant SPIRA Condensing Wood Pellet boiler requires a 230 V ~50 Hz electrical supply. The unit should be connected to a mains power supply that is protected by a 30mA RCD.

For the UK, the electrical installation must be carried out by a competent installer in accordance with the requirements of the Electricity at work Regulations 1989 and BS7671:2008 – IEE Wiring Regulations 17th Edition (including all amendments)

If installed in the Republic of Ireland, the wiring installation must comply with all ETCI rules.

All the wiring and supplementary earth bonding external to the boiler must be in accordance with the current I.E.E. wiring regulations.

Any heating system controls, e.g. room thermostat, frost thermostat, etc. connected to this boiler must be suitable for use on mains voltage.

8.2 Hopper Electrical Connections

7.2.1 Single Boiler Hopper

(with a single auger) – in either a left hand or right hand version as required, to supply a single boiler.

This hopper is fitted with three pre-wired flying leads with factory-fitted plugs:

- 4-way plug – for connection of the permanent live, earth and neutral and also the switched live from the heating controls system.
- 5-way plug – to connect the hopper to the boiler.
- 6-way plug – to connect either a bulk pellet store auger or Grant SPIRA-VAC vacuum system to the hopper and boiler.

Refer to Figure 8-7 for hopper wiring diagram.

8.2.2 Double Boiler Hopper

(with two augers) – to supply two boilers in a 'double boiler' installation.

This hopper is fitted with four pre-wired flying leads with factory-fitted plugs:

- 4-way plug – for connection of the permanent live, earth and neutral and also the switched live from the heating controls system.

- Two 5-way plugs – one to connect to each of the two boilers.
- 6-way plug – to connect either a bulk pellet store auger or Grant SPIRA-VAC vacuum system to the hopper and boiler.

Refer to Figure 8-8 for double hopper wiring diagram.

8.2.3 For Installations with a Bulk Pellet Store only

Both single boiler and double boiler hoppers are supplied with the 6-way plug parked inside the wiring enclosure. See Figure 8-1.

If a bulk pellet store is to be used:

- Remove the wiring centre cover from the rear of the hopper.
- Unclip the 6-way plug from diaphragm switch bracket.
- Pass the 6-way plug lead through the grommet just below the wiring centre cover.
- Set the toggle switch on the diaphragm switch bracket to 'BULK STORE'. See Figure 8-1.
- Replace the wiring centre cover and fasten in place using the screws previously removed.
- Connect the 6-way plug to the corresponding 6-way connector on the pre-wired flying lead fitted to either the bulk pellet auger or Grant SPIRA-VAC system.
- If using the Grant SPIRA-VAC system, refer to the installation instructions supplied with the system for further details on its installation and operation.



Figure 8-1: Hopper selector switch

8.2.4 For Installations using the Pellet Hopper only

When used without a bulk pellet store, the pellet hopper has the facility for the connection of a 230V 'low pellet' indicator lamp (not supplied). This will indicate to the householder that the pellets in the hopper have reached the minimum level and the hopper needs to be topped up.

The indicator lamp should be positioned so it can be easily viewed by the householder. See either Figure 8-7 or 8-8, as applicable, for the connection details.

If a bulk store is used, with either the Grant SPIRA-VAC system or a Grant bulk auger, a 'low pellet' indicator lamp **cannot** be fitted to the pellet hopper.

8.3 Boiler Plug Connections

Before making any electrical connections to the hopper (by connecting the 4-way plug and socket together) ensure that all the plug connections have been correctly made between the hopper, boiler and (if fitted) the bulk pellet supply system, as follows:

1. Fit the 5-way plug from the flue fan and solenoid valve into the socket at the top right rear of the boiler. See Figure 8-2. Ensure it is fully pushed home.



Figure 8-2: Flue fan/solenoid valve plug connection

2. Fit the 5-way plug from the hopper into the socket at the top left rear of the boiler. See Figure 8-3. Ensure it is fully pushed home.



Figure 8-3: Hopper plug connection

3. On a double boiler installation, fit the second 5-way plug from the double hopper into the top right rear of the second boiler. Ensure it is fully pushed home.
4. Fit the two 7-way plugs (No.1 and No.2) from the boiler control panel into the two lower connections on the left side of the burner. These plugs are male and female and cannot be fitted into the wrong connections. Refer to Figure 8-3. Ensure that both plugs are fully pushed home until the small catch on each of them clicks into place.
5. Fit the 6-way plug (No.3) from the pellet feed auger motor into the upper connection on the left side of the burner. Refer to Figure 8-4. Ensure that the plug is fully pushed home until the small catch it clicks into place.

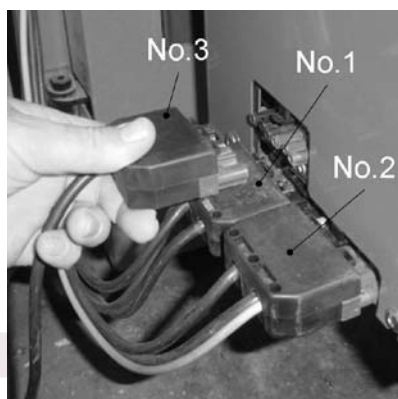


Figure 8-4: Auger plug connection

6. If a bulk pellet store is to be used, connect the 6-way plug to the corresponding connection on the flying lead from either the Grant SPIRA-VAC system or Grant bulk pellet store auger. Ensure that the plug and socket are fully pushed together until the small catch clicks into place.

Refer to instructions supplied with either the Grant SPIRA-VAC or Grant bulk store auger for further details.

8.4 Heating System Controls

The boiler can be used in conjunction with typical heating control system, e.g. 'S-Plan' or 'Y-Plan' type controls. Refer to Figures 8-9 and 8-10 and for typical control system wiring diagrams.

As the electrical connection (permanent mains supply and switched live from the heating control system) to the boiler is made via the flying lead with 4-way plug connection it will be necessary to provide a 4-core flying lead either

- a) Directly from the heating controls wiring centre – if suitable located adjacent to the boiler/hopper, or
- b) Via a junction box situated adjacent to the boiler hopper.

The length of 4-core flex required (between the wiring centre or junction box and the 4-way plug connection) must be sufficient to allow the hopper to be moved out enough to allow disconnection the 4-way plug.

Frost Protection

For additional protection of either the entire heating system, or the boiler and localised pipework, it is recommended that a frost thermostat be installed. It is also recommended that it be used in conjunction with a pipe thermostat to avoid unnecessary and wasteful overheating of the property.

The pipe thermostat should be located on the boiler return pipe, and set to operate at 25°C. Refer to Figures 8-9 or 8-10 as appropriate for connection details.

8.5 Connecting the Power Supply



Before making any connections to the heating systems controls ensure that the electrical supply is isolated at the fused spur serving the controls and boiler, that the fuse has been removed and the isolator is locked off.

Do NOT connect the electrical supply to the hopper, by connecting the 4-way plug and socket together, until ALL plug connections have been correctly made between the hopper, boiler and (if fitted) the bulk pellet supply system.

The boiler requires a permanent mains supply and a switched live supply to control the boiler. For details of Controls refer to Section 8.4 and Figures 8-9 or 8-10.

Do NOT interrupt the permanent supply to the hopper/boiler with any external controls.

The power supply cable and flex should be at least 0.75mm² PVC as specified in BS 6500 - Table 16.

Connect the mains supply using the following procedure:

1. Press down on the small catch (between the two parts of the factory-fitted 4-way plug/socket connector) to release it.
2. Separate the two parts and remove the cover from the male 4-way plug.
3. Connect the flex to the 4-way male plug as follows:
 - Terminal L2 – Switched live (from heating system controls)
 - Terminal N – Mains neutral
 - Terminal (earth) – Mains earth
 - Terminal L1 – Mains (permanent) live
4. Replace the cover, ensuring outer sheath of the flex is held in the cable grip of the plug, and secure using the screws previously removed.

8 Electrical

- Connect the other end of the 4-core flex to the either the heating system controls wiring centre or junction box. Refer to either Figures 8-9 or 8-10, as appropriate, for details of the connections required.
- Fit the two parts of the 4-way connector back together. Ensure the plug and socket are fully pushed together until the small catch clicks into place.



WARNING

The Grant wood pellet boiler and intermediate hopper contains electrical switching equipment and must be earthed; also any bulk hopper system fitted should also be earthed.

In the event of an electrical fault after installation of the boiler, the following electrical system checks must be carried out.

- Short circuit
- Polarity
- Earth continuity
- Resistance to earth

8.6 Wiring Diagrams

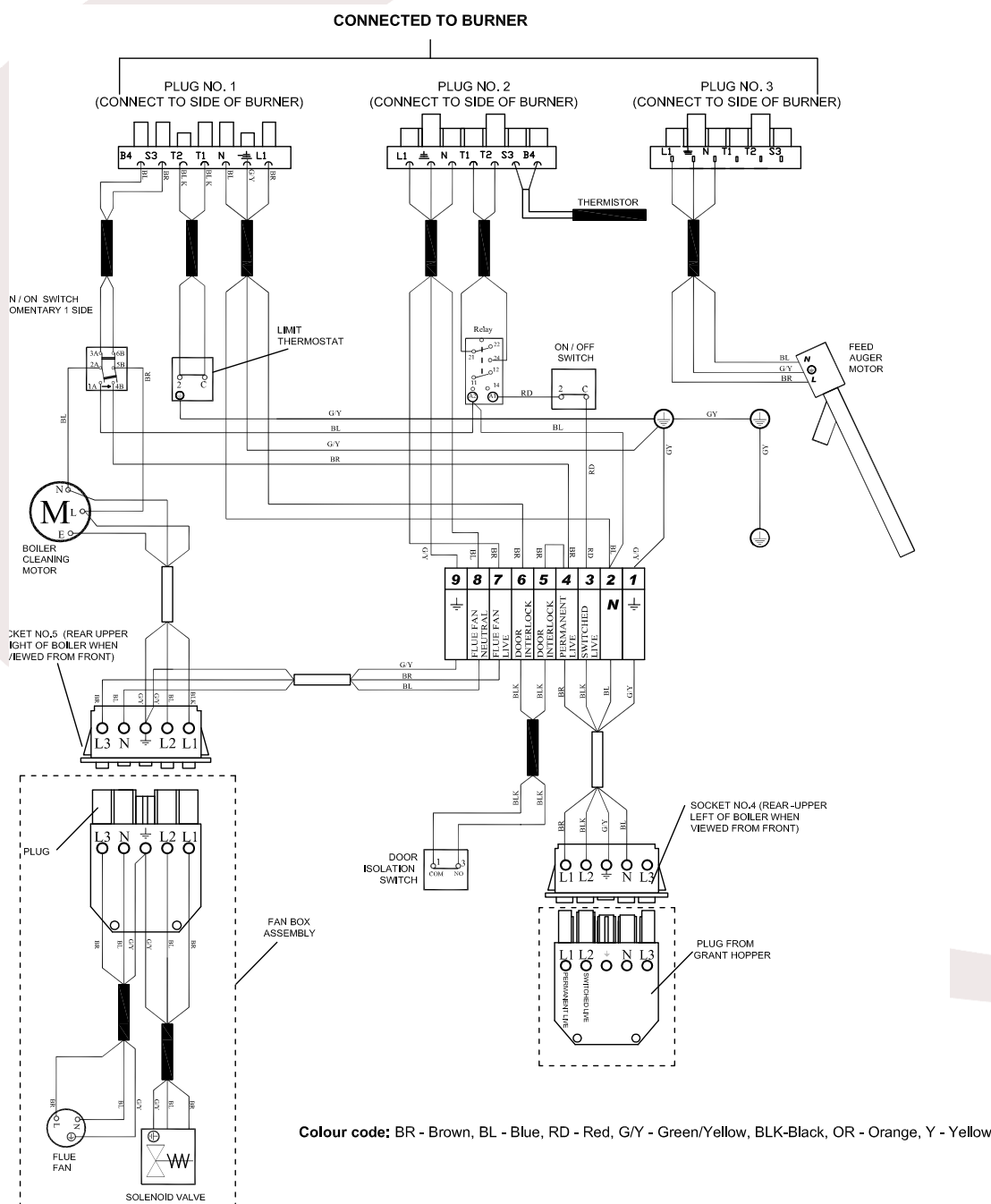


Figure 8-5: Boiler internal wiring diagram

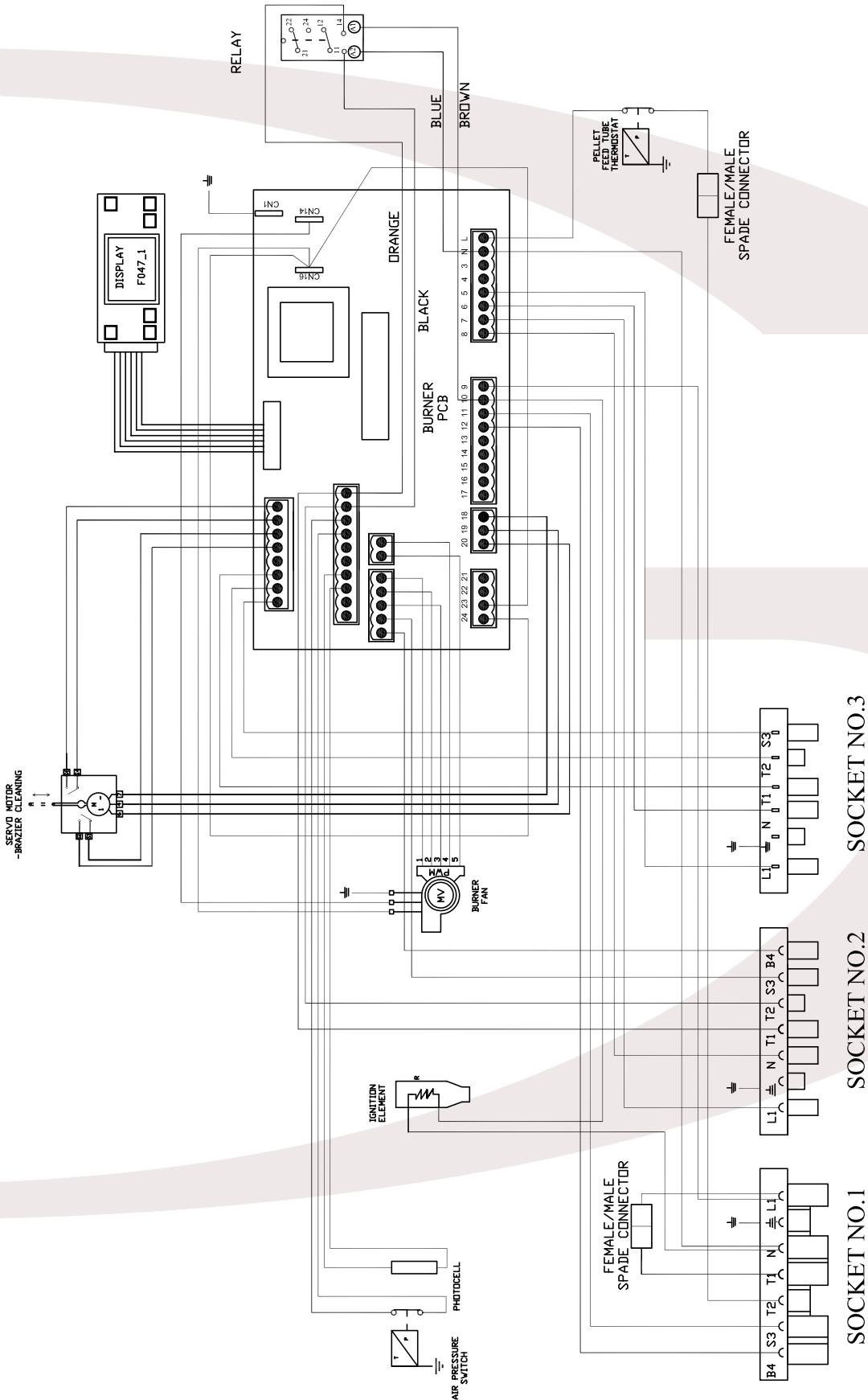


Figure 8-6: Burner wiring diagram

8 Electrical

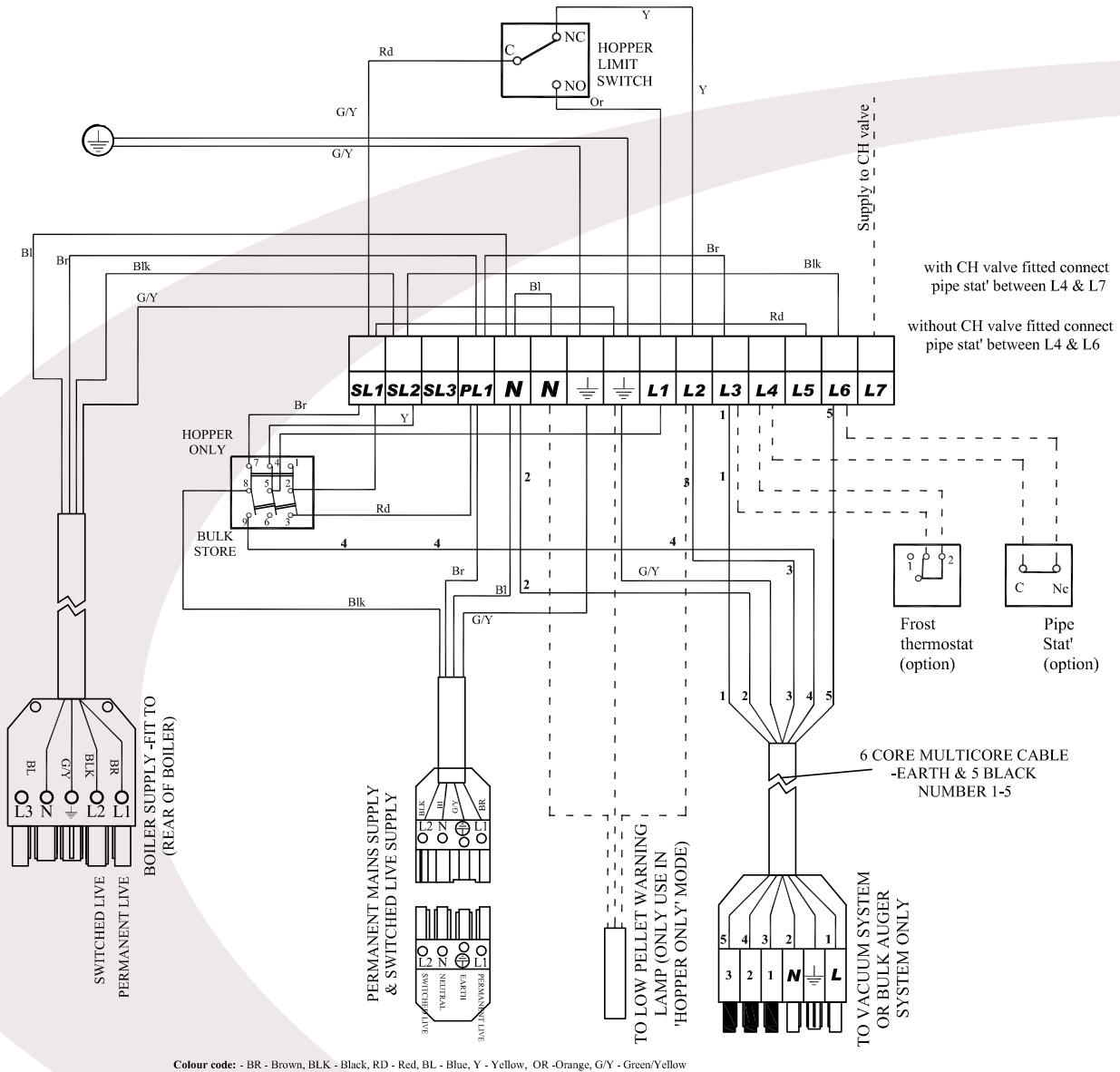


Figure 8-7: Hopper wiring diagram – single boiler hopper

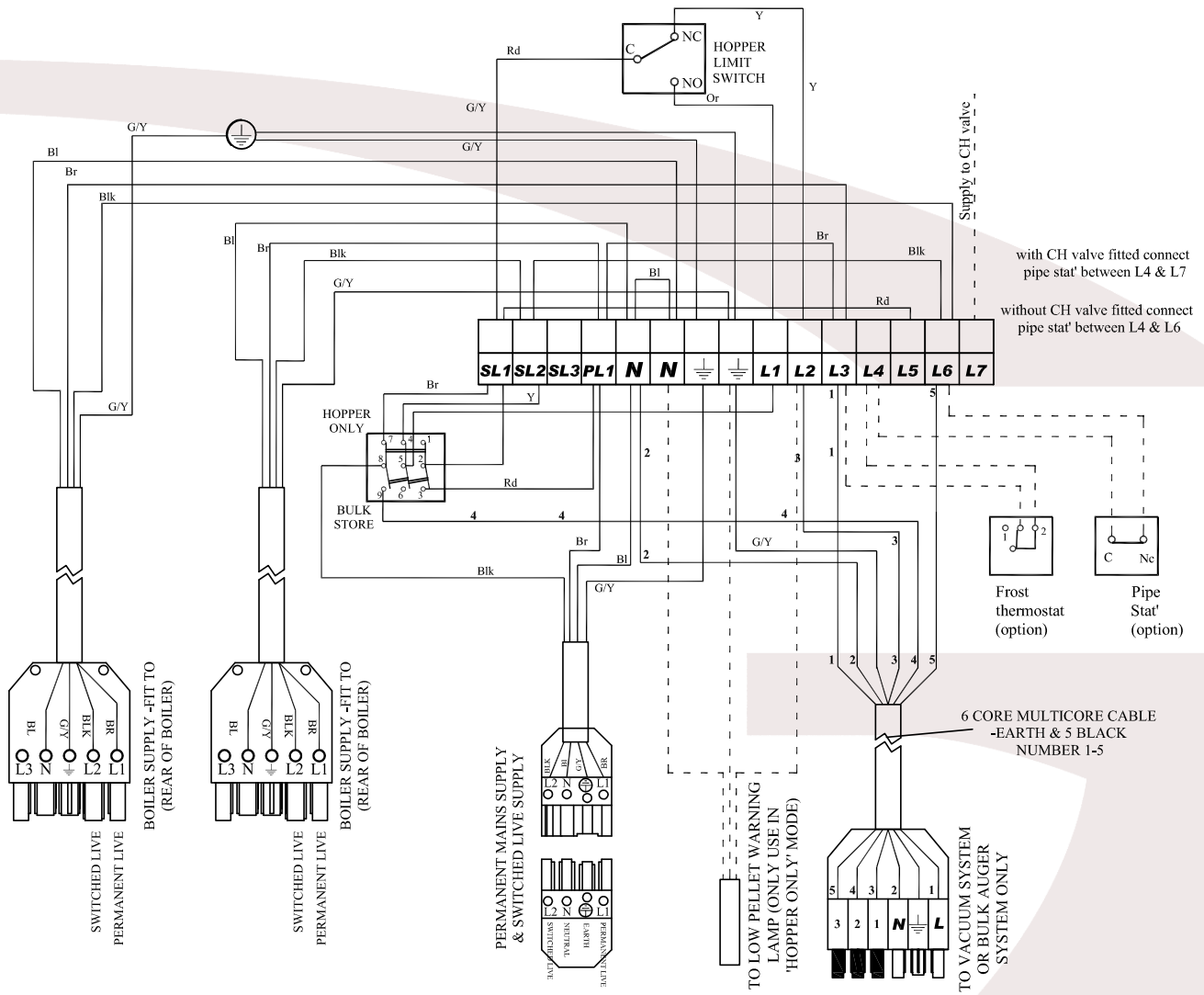


Figure 8-8: Hopper wiring diagram – double hopper

8 Electrical

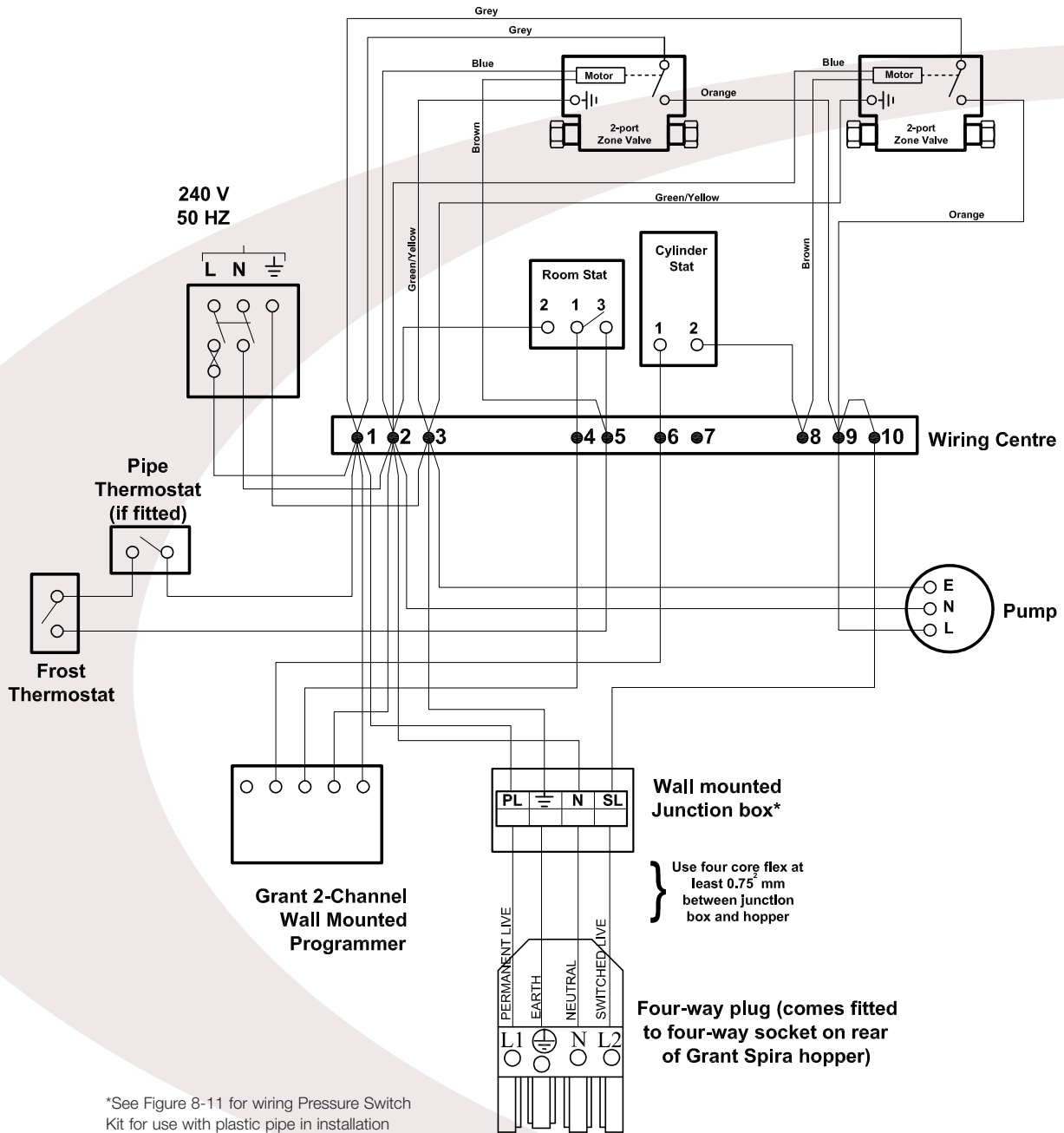


Figure 8-9: Heating system controls – S-plan type system connection diagram

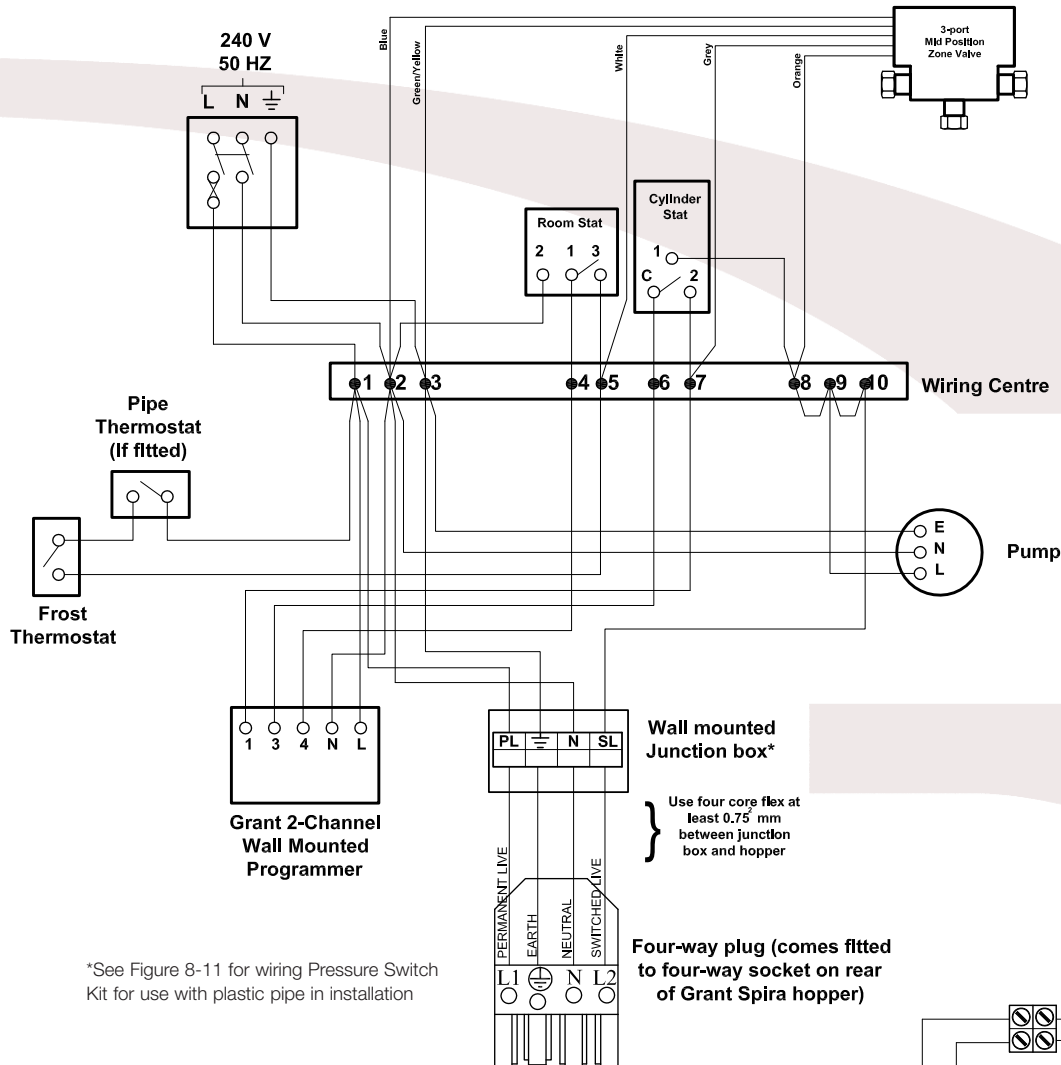


Figure 8-10: Heating system controls – Y-plan type system connection diagram

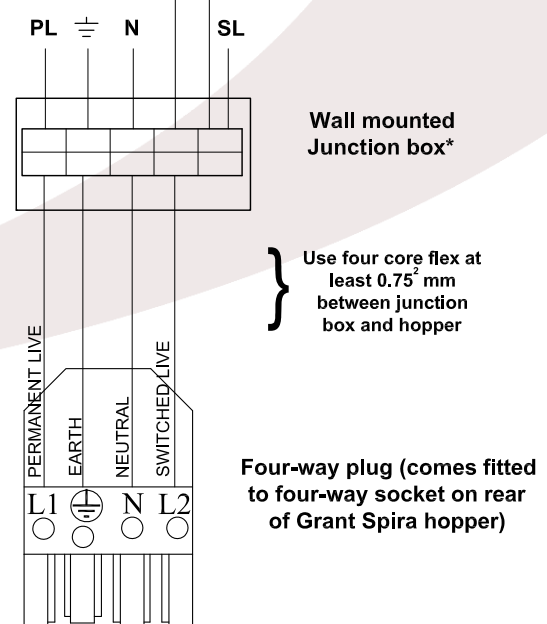


Figure 8-11: Connection of Grant low water pressure switch (ref. MPCBS62)

9 Burner

9.1 Burner Operation

The burner controls the pellet feed auger, flue fan, boiler temperature and also the boiler and brazier cleaning systems. The burner comes with a display screen and six control buttons. These buttons are to access the menus and control the burner functions.

The burner is equipped with a brazier where the combustion of the wood pellets takes place within the boiler. The self cleaning device on the brazier is automatically activated after the pellet feed auger run time has exceeded a predetermined set time. The pellet feed auger run time for brazier and boiler cleaning is pre-set in the burner menu.

The temperature of the water within the boiler is controlled via a thermistor to the burner. The thermistor is inserted into the boiler water jacket and is used by the burner to control the modulation of the boiler output.

The boiler has a set point temperature. This is the target flow temperature from the boiler. As the temperature of the boiler increases and reaches the set point less 5°C the output of the boiler is reduced by one step. Each subsequent 1°C increase in boiler temperature reduces the output of the boiler by one modulation step until the temperature reaches the set point plus 5°C. At this point the boiler output is 'MINIMUM FLAME' which is minimum output setting of the boiler. The percentage increase or decrease in power is calculated on the rate of temperature change. The sequence of operation is described in Section 9.3.

9.2 Burner Operational Modes

'BOILER WAIT THERMOSTAT':

(operation code 03) Boiler is in standby awaiting the following;

- A switched live input signal from a control system.
- The boiler temperature to drop below the 'DELTA RESTART' temperature. ('DELTA RESTART' is the temperature the burner restarts after maximum temperature has been reached).
- The ON/STANDBY switch on the control panel is set to the 'ON' position.

'WAIT PRELOAD BRAZIER':

(operation code 40) Initial loading of pellets into the brazier to enable combustion to start.

- Activated with a switched live input signal and/or temperature drops below the 'DELTA RESTART' temperature.
- Deactivated after time exceeds 'T08'.

'WAIT LIGHTING' – IGNITION:

(operation code 41) Period of time given for pellets to light.

- Activated after 'PRE LOAD' operation is complete.
- Deactivated once photocell lux reading exceeds 'FLAME ON' setting.

'WAIT LIGHTING' – FLAME

STABILISATION: (operation code 45) Period of time to allow flame stabilise after pellets have ignited.

- Activated after ignition mode.
- Deactivated after time exceeds 'T13'.

'WAIT LIGHTING' – LIGHTING FEED

REDUCED: (operation code 42) Period of time intermittent quantities of pellets supplied to the brazier to increase the flame.

- Activated after -'WAIT LIGHTING' flame stabilization mode.
- Deactivated after time exceeds 'T09'.

'PELLET BURNER FIRING': Power 100% (operation code 13) Flame is fully developed and boiler is operating on full power.

- Activated after -'WAIT LIGHTING' lighting feed reduced mode
- Deactivated after temperature is within 'TEMP DELTA' range.

'PELLET BURNER FIRING': Power (modulating) (operation code 13) Flame is reduced and boiler output is modulating.

- Activated once the boiler temperature is within the 'TEMP DELTA' range.
- Deactivated after temperature exceeds the 'TEMP DELTA' range.

'PELLET BURNER FIRING': Power (minimum) (operation code 13) Flame is reduced and boiler is at its minimum output.

- Activated once the boiler temperature exceeds the 'TEMP DELTA' range.
- Deactivated after the temperature exceeds 'TEMP OFF H2o'.

'TURNING OFF BRAZIER': (Operation code 14). Burn down period to remove any pellets remaining in the brazier.

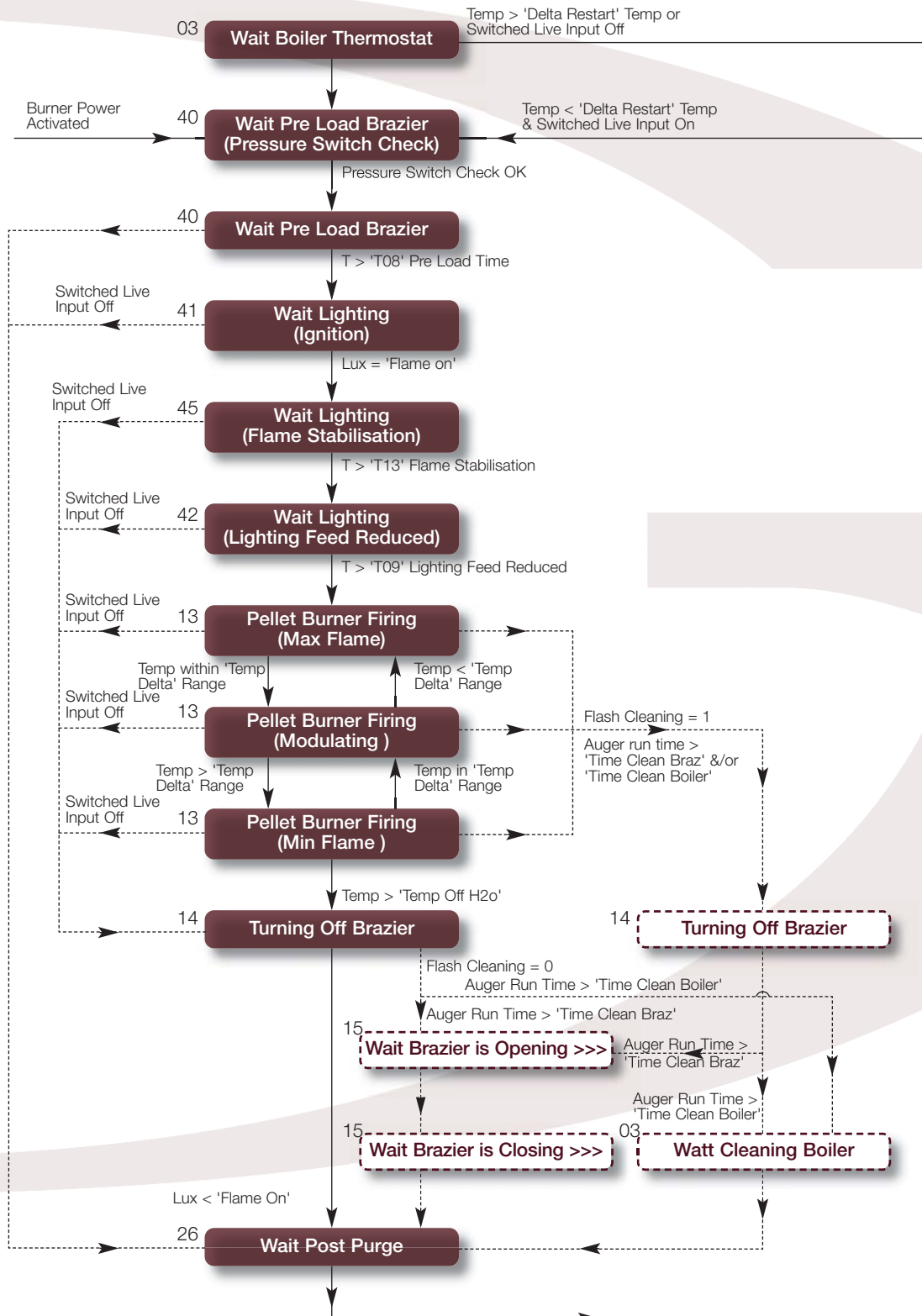
- Activated once switched live input signal is switched off or the boiler temperature exceeds 'TEMP OFF H2o' setting.
- Deactivated once photocell lux reading has dropped below the 'FLAME ON' setting less.

'WAIT POST PURGE': (operation code 26) Period of time after burn down is complete to ensure no unburnt pellets ignite.

- Activated after 'TURNING OFF BRAZIER' is complete.
- Deactivated after time exceeds 'T22'.

9.3 Burner Operational Sequence

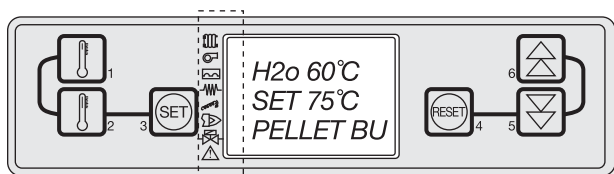
Flow Chart of Operation of Wood Pellet Boiler



For 'STEP AUTO' function (the two digit code allocated to each function). Refer to Section 9.7.3.

9 Burner

9.4 Burner Display Screen



Active symbols

- = Boiler thermostat calling
- = Burner fan operational
- = Pressure switch closed
- = Ignition element operational
- = Feed auger operational
- = Photocell lux reading >'Flame On' setting
- = n/a
- = Error

9.5 Burner Control Buttons

The burner has six control buttons, these perform the following tasks.

Button No.1



Normal Mode; Increase temperature set point by 1°C
Menu mode; Scroll up

Button No.2



Normal mode; Decrease temperature set point by 1°C
Menu mode; Scroll down

Button No.3



Menu mode; Scroll forward

Button No.4



Normal mode; Reset fault
Menu mode; Scroll back

Button No.5



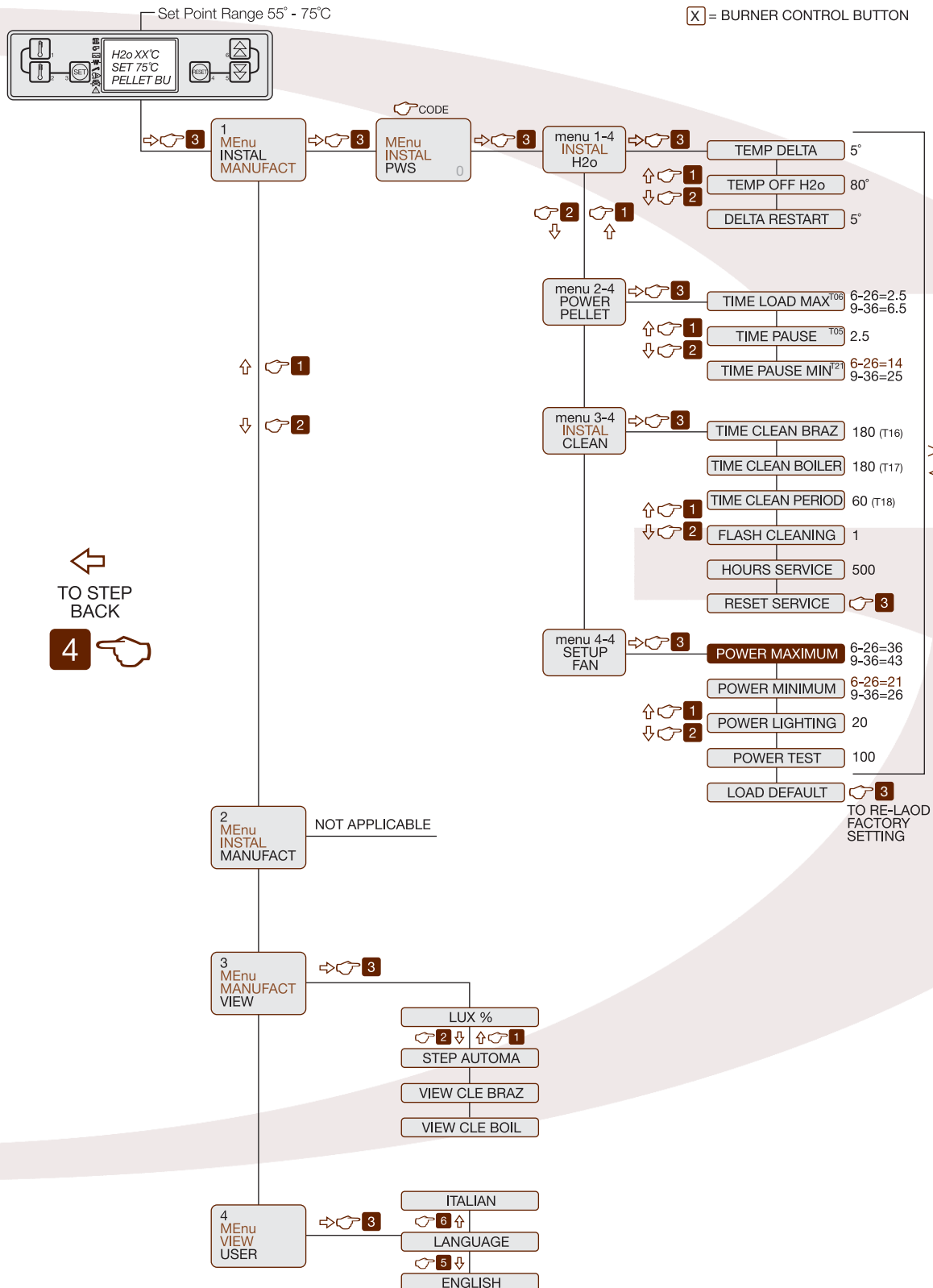
Menu mode; Decrease parameter value

Button No.6



Menu mode; Increase parameter value

9.6 Burner Menu Navigation Chart and Factory Default Settings



9 Burner

9.7 Burner Menu

Using the main menu flow chart shown in Section 9.6 navigate the menus using the buttons as described in Section 9.5.

Each of the four main folders is described in further detail as follows;

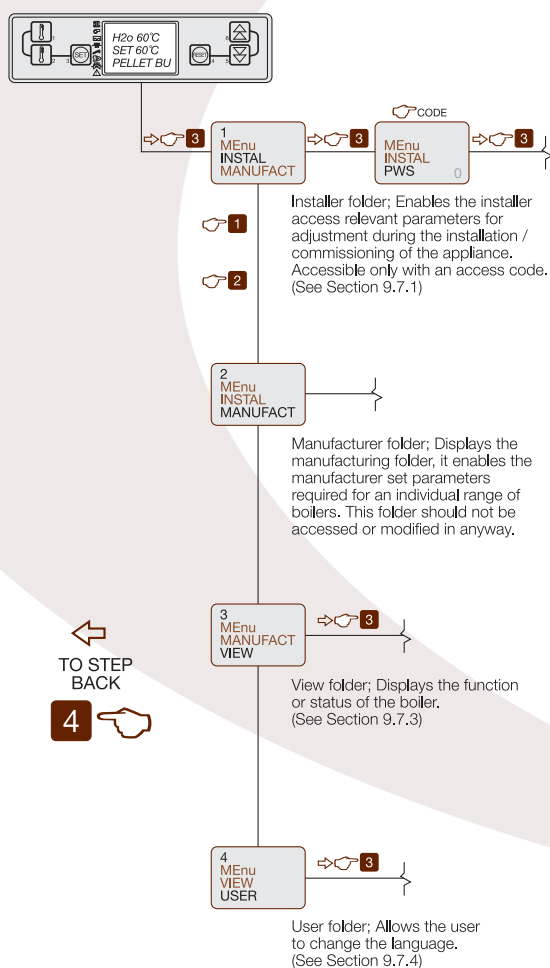
‘**INSTAL**’, Installer folder, see Section 9.7.1

‘**MANUFACT**’ not applicable.

‘**VIEW**’ folder, see Section 9.7.3.

‘**USER**’ folder, see Section 9.7.4.

Press button ‘**3**’ to open the menu settings. Once the menu settings option is activated there are four folders to choose from as shown below.



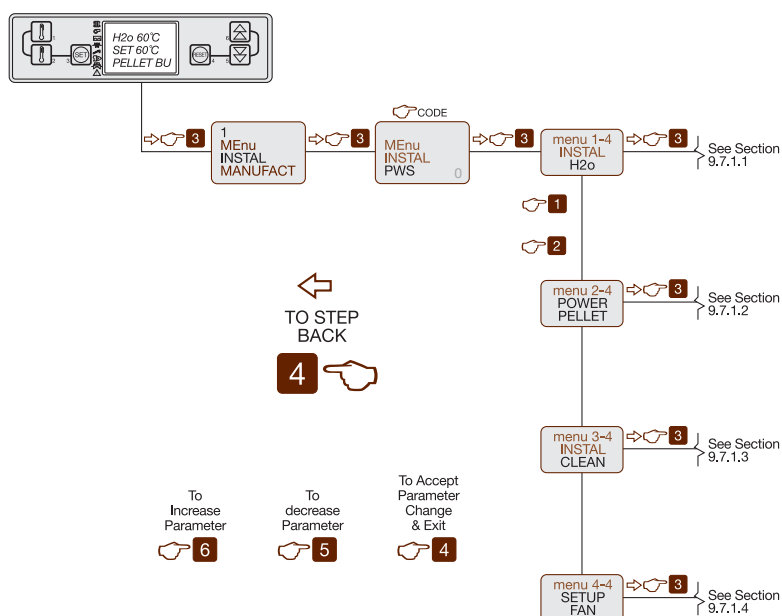
9.7.1 ‘INSTAL’ menu folder

‘**INSTAL**’ represents the Installer folder. It enables the installer access relevant parameters for adjustment during the installation / commissioning of the appliance. Only accessible with an access code.

The ‘**INSTAL**’ folder has four sub folders;

- menu 1-4, H2o
- menu 2-4, POWER PELLET
- menu 3-4, CLEAN
- menu 4-4, SETUP FAN

To access the parameters within the ‘**INSTAL**’ folder from the main burner display, navigate as follows;



9.7.1.1 ‘menu 1-4- H2o’ sub folder contains three parameters stored within this folder;

- TEMP DELTA**: Defines the boiler temperature either side of the Set-point in which the boiler will modulate. Units -°Celsius. Default setting 6-26 & 9-36 = 5 (5°C).
- TEMP OFF H2o**: Temperature the burner’ shuts down. Units -°Celsius. Default setting 6-26 & 9-36 = 80 (80°C).
- DELTA RESTART**: Temperature drop below the set-point before burner re-starts. Units -°Celsius. Default setting 6-26 & 9-36 = 5 (5°C).



CAUTION

Settings in the burner menu's below are based on the boiler using the Grant fixed angle pellet feed auger at 45° and an auger motor fixed speed of 8.1 rpm. Only ENplus A1 (EN14961-2) pellets **MUST** be used with the Grant SPIRA boilers. These pellets must be bark and sand free **AND** approved by Grant UK. **BEFORE** being used in the Spira boilers. Failure to use approved pellets will invalidate the product warranty.

9.7.1.2 'menu 2-4- POWER PELLET'

The parameters stored within this folder are;

- a) **TIME LOAD MAX:** Time the pellet feed auger operates to deliver pellets to the brazier when the burner is in max flame mode.

Adjusting this time adjusts the boiler input in max flame, i.e. the larger the load time, the greater the input, alternatively the smaller the load time the lower the input (see table Section 2.2.1).

Units 000.0 seconds.
Default setting 6-26 = 25 (2.5 seconds).
Default setting 9-36 = 65 (6.5 seconds).

- b) **TIME PAUSE MAX:** Time between pellet feed auger operations when the burner is in max flame mode. Adjusting this time adjusts the boiler input in max flame, i.e. the larger the pause time, the lower the input, alternatively the smaller the pause time the higher the input (see table Section 2.2.1).
Units 000.0 seconds.
Default setting 6-26 & 9-36 = 0025 (2.5 seconds).
- c) **TIME PAUSE MIN:** Time between pellet feed auger operations in min flame. Adjusting this time adjusts the boiler input in min flame, i.e. the larger the pause time, the lower the input, alternatively the smaller the

pause time the higher the input (see table Section 2.2.1).
Units 000.0 seconds.
Default setting 6-26 = 140 (14.0 seconds).
Default setting 9-36 = 250 (25 seconds).



NOTE

Adjusting this setting will also result in the input during the modulation period being adjusted as the modulation input is automatically calculated on the max/min & load/pause settings.

9.7.1.3 'menu 3-4- CLEAN'

The parameters stored within this folder are;

- a) **TIME CLEAN BRAZ:** Total pellet feed auger run time before burner brazier cleaning operation activates. (If the burner shuts down immediately or waits for the next shut down is determined by 'FLASH CLEANING' see 8.3.1.3 d.)
Default setting 6-26 & 9-36 = 180 (180 minutes).
- b) **TIME CLEAN BOILER:** Total pellet feed auger run time before boiler cleaning operation activates.
Default setting 6-26 & 9-36 = 180 (180 minutes).
- c) **TIME CLEAN PERIOD:** Time period boiler cleaning function is operational once 'TIME CLEAN BOILER' has elapsed.
Default setting 6-26 & 9-36 = 60 (60 seconds).
- d) **FLASH CLEANING:**
Commencement of brazier cleaning.
1 = Interrupt burner firing, shut down and clean brazier when time is greater than 'TIME CLEAN BRAZ'.
0 = at next burner shut-down, clean brazier when time is greater than 'TIME CLEAN BRAZ'.
Default setting 6-26 & 9-36 = 1.

- e) **HOURS SERVICE:** Time lapse period before the burner screen displays 'SERVICE'. This is to indicate a service is now due.
Default setting 6-26 & 9-36 = 500 (500 hrs).

RESET SERVICE: to cancel the 'SERVICE' display on the burner screen after the boiler has been serviced. Press button 3 ('SET') followed by button 4 ('RESET') five times to exit the menu.
IT IS ESSENTIAL TO RESET THE SERVICE DISPLAY AND AFTER EACH SERVICE.

9.7.1.4 'Menu 4-4- SETUP FAN'

- a) **POWER MAXIMUM:** Burner fan speed setting when burner in 'max' output mode.
Default setting 6-26 = 36.
Default setting 9-36 = 43.
- b) **POWER MINIMUM:** Burner fan speed setting when burner in 'min' output mode.
Default setting 6-26 = 21.
Default setting 9-36 = 26.
- c) **POWER LIGHTING:** Burner fan speed setting when burner in lighting mode.
Default setting 6-26 & 9-36 = 20.
- d) **POWER TEST:** Used to simulate the burner fan speed for test purposes only. Once the 'POWER TEST' is cancelled from the screen the burner fan reverts to its required operational speed.
- e) **LOAD DEFAULT:** Load factory default settings. Press button 3 to activate factory default settings.

9.7.2 'MANUFACT' Menu Folder

2
MEnu
INSTAL
MANUFACT

'MANUFACT' displays the manufacturer folder; it enables the manufacturer set parameters required for an individual boiler. This folder should not be accessed or modified in anyway.

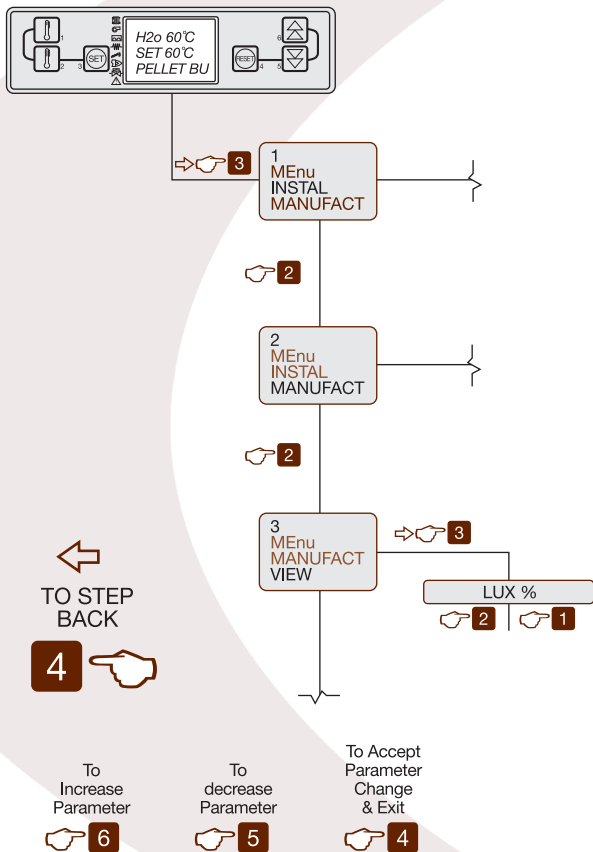
Burner

9.7.3 VIEW Menu Folder

3
MEnu
MANUFACT
VIEW

'VIEW' folder displays the function or status of the boiler.

To access the menu displays within the 'VIEW' folder from the main burner display, navigate as follows;

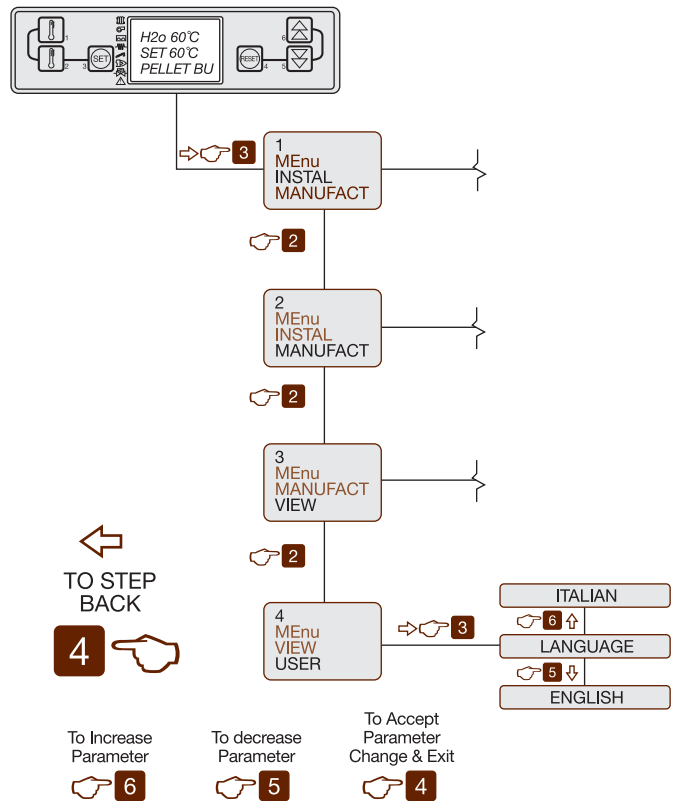


9.7.4 USER Menu Folder

4
MEnu
VIEW
USER

'USER' folder; allows the user change the language on the burner display.

To access the menu displays within the 'USER' folder from the main burner display, navigate as follows;



The language options are Italian or English. Once exited, the language selection shown on screen becomes the displayed language.

The 'VIEW' menu folder has 4 readout displays as follows;

- LUX %:** Light illumination measured by the Photocell. Readout is instantaneous.
- STEP AUTO:** Each boiler function is allocated a two digit number. This menu displays the function the boiler is in when viewing. The list of the functions are as follows:
03 - Wait Boiler Thermostat
13 - Pellet Burner Firing
14 - Turning Off Brazier

- Brazier is moving back
- Brazier is moving forward
- Post Purge
- Air Pressure Error
- Failed Pellet Lighting
- Servo Motor Blocked
- Pre-load
- Wait Lighting (Ignition)
- Wait Lighting (Lighting Feed Reduced)
- Wait Lighting (Flame Stabilisation)
- Safety Charge Pipe Thermostat
- Safety Boiler Thermostat
- Probe Fault

- VIEW CLE BRAZ** Total pellet feed auger run time since brazier last cleaned. When \geq "T16" brazier cleaning operation will commence. Resets after each brazier clean.
- VIEW CLE BOILER** Total pellet feed auger run time since boiler last cleaned. When \geq "T17" boiler cleaning operation will commence. Resets after each boiler clean.

10 Commissioning

It is important that the following commissioning procedure is carried out following installation to ensure safe and efficient operation of the boiler.

For double boiler installations this procedure must be carried out in full on both boilers.

10.1 Equipment Required

To carry out a complete and comprehensive commissioning of the Grant Spira wood pellet boiler the following equipment is required.

- Draught meter.
- Flue gas analyser (with “wood pellet” fuel setting).
- Container of at least 1 litre capacity.

10.2 Preliminary Inspection

Before switching on the power supply to the hopper and boiler check the following:

10.2.1 Heating System

Check the following:

- That corrosion inhibitor and, where necessary antifreeze, is present in the system water. Refer to Section 4.6.
- That a magnetic in-line filter has been fitted in the system. Refer to Section 4.6.
- The auto air vent (supplied with the boiler) is open.
- The boiler drain cock (supplied with the boiler) is closed.
- Both the boiler and heating system is filled and vented.
- On sealed systems the expansion vessel charge pressure is correct and system is filled to correct pressure.
- For any leaks at joints, fittings, etc.

10.2.2 Electrical Connections

Check the following:

- The 5-way plug (from the hopper) is fully inserted in the socket at the top left rear of boiler. Refer to Figure 8-3.
- The 5-way plug (from the flue fan and washdown solenoid valve) is fully inserted in the socket at the top right rear of the boiler. Refer to Figure 8-2.
- The two 7-way plugs (from the boiler control panel) are fully inserted into the corresponding two

lower connections on the left side of the burner. Refer to Figure 8-4.

- The 6-way plug (from the pellet auger) is fully inserted into the upper connection on the left side of the burner. Refer to Figure 8-4.

On double boiler installations, repeat the process for the second boiler.

10.2.3 Washdown System

Check the following:

- The washdown system manifold pipe is correctly fitted into either the right or left side of the boiler, as required to suit the type of hopper used.
- The solenoid valve head is correctly fitted and secured in position with the steel clip provided with the boiler.
- The solenoid valve is connected to an uninterrupted mains water supply via the flexible hose and valve (with integral check valve) provided with the boiler.
- All valves in this water supply are open.

On double boiler installations, repeat the process for the second boiler.

10.2.4 Condensate Disposal System

Check the following:

- The condensate trap (supplied with the boiler) and condensate disposal pipework has been fitted correctly. Refer to Section 5.
- If a condensate pump is fitted, that a condensate holding tank of at least 40 litres capacity has also been installed. Refer to Section 5.

10.2.5 Flue System

Check the following:

- The draught stabiliser damper, on the fan box, is unobstructed and free to move. Ensure that the damper locking lever is in the ‘unlocked’ position’. Refer to Figure 10-1.



Figure 10-1: Draught stabiliser

- The flue system conforms to the relevant requirements of The Building Regulations Approved Document J for solid fuel appliances.

9.2.6 Combustion Ventilation

Check that the combustion air supply conforms to the relevant requirements of The Building Regulations Approved Document J, for solid fuel appliances with a draught stabiliser. Refer to Section 7.1.

10.3 Boiler

10.3.1 Control Panel

Isolate the electrical power to the hopper and boiler.

Unscrew and remove the six self tapping screws securing the boiler control panel cover and lift the cover off the control panel.

Check the following:

- That both the overheat thermostat probe and thermistor bulb are fully inserted in the boiler waterway pocket, and the retaining clip is fitted. Refer to Figure 10-2.
 - The condition of thermistor cable and thermostat capillary, i.e. not damaged, broken or kinked.
- Refit the control panel cover and secure with the six screws previously removed.

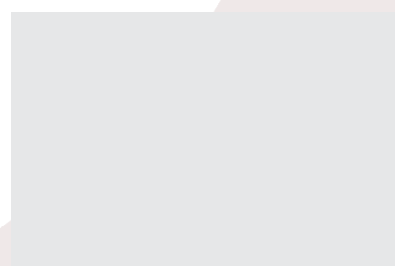


Figure 10-2: Boiler control panel (cover removed)

10.3.2 Combustion Chamber

Open front access cleaning door and check:

- The ash pan is empty and correctly positioned on the base of the combustion chamber.
- The baffle (in the top of the combustion chamber) is correctly located on the fixing brackets at both sides. Refer to Figure 10-3.

Close the front access cleaning door and ensure that door catch is fully engaged (to activate door cut-out switch).

10 Commissioning

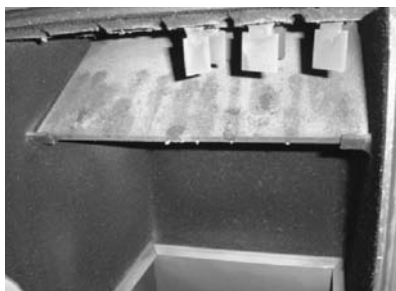


Figure 10-3: Combustion chamber baffle

10.3.3 Heat Exchangers

To gain access to the top of both heat exchangers:

- Remove the boiler top casing panel.
- Unscrew and remove the two nuts securing the front access panel and remove it from the primary heat exchanger.
- Unscrew and remove the two nuts securing the rear access cover and remove it from the secondary (condensing) heat exchanger.

Check that the spiral baffles in the primary heat exchanger are all in place. Lift and drop each one to check all are free to move in their respective tubes.

Check that the spiral baffles in the secondary heat exchanger are all in place and are all aligned with the top edges running 'front to back'.

Test the automatic cleaning functions as follows:

- Set the **ON/STANDBY** switch to **STANDBY**.
- Switch on the electrical supply to the hopper and boiler. The burner fan should briefly run.
- Press and hold down the '**CLEANING**' switch, on the boiler control panel, in the '**TEST**' position.
- Release switch to automatically reset cleaning function back to '**AUTO**'.
- Note that setting this switch to '**TEST**' does NOT operate the burner cleaning function, but only that of the two heat exchangers.



WARNING

Ensure that fingers are clear of all moving parts inside the top of the primary heat exchanger **BEFORE** operating '**CLEANING TEST**' switch.

Primary Heat Exchanger

Check the shaker unit (located in the top of the primary heat exchanger) is operating freely and that the spirals are moving up and down with two intermittent vertical motions.

Secondary Heat Exchanger

Check the wash system manifold (located under the top rear access door) is spraying water directly into each flue gas tube of the unit. Refer to Figure 10-4.

If the water jets are not spraying directly into the flue gas tubes, adjust the spray as follows:

- Slacken the two screws securing the manifold pipe flange to the boiler side panel.
- Carefully rotate the pipe until jets spray directly into tubes.
- Tighten the two screws to secure manifold pipe in this position.

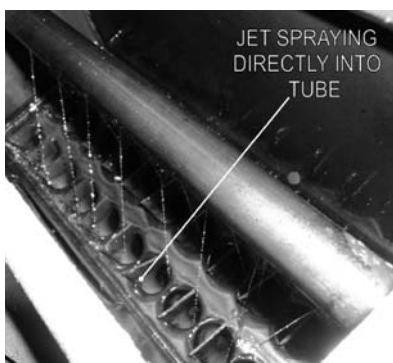


Figure 10-4: Correct jet spray (into tubes)



Figure 10-5: Incorrect jet spray

Refit both front and rear access panels and secure with the nuts previously removed. Do not overtighten.

10.4 Pellet Hopper

Check the pellet feed auger is fully inserted into the pellet hopper and secured with the single screw through the auger fixing flange. Refer to Figure 10-6. **Do NOT fill hopper with pellets until AFTER the auger is fitted and secured.**

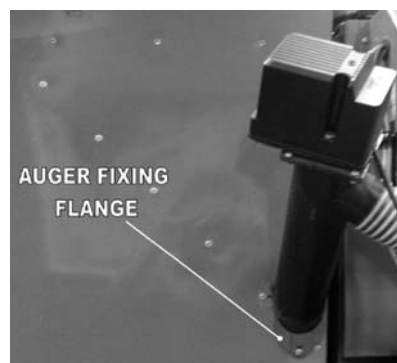


Figure 10-6: Auger fixing



WARNING

Before filling the pellet hopper for the first time with pellets, ensure that hopper is empty of all other debris or objects, e.g. screws, nuts, etc.

Ensure that only pellets that comply with ENplus A1 standard, to EN14961, are used with the Grant Spira boiler. Refer to Section 3.

Fill the hopper with pellets either:

- By hand from bags, or
- Automatically from a bulk pellet store, via a bulk auger or Grant SPIRA-VAC vacuum pellet feed system.

When using a Grant SPIRA-VAC system, refer to the Installation instructions supplied with the Grant SPIRA-VAC vacuum pellet feed system.

10.5 Safety Device Checks

10.5.1 Burn Back Thermostat

When the burner display reads '**WAIT BOILER THERMOSTAT**' check the operation of the burn-back thermostat (on the pellet feed tube) as follows:

- Remove the steel clip from the thermostat.
- Disconnect the lead from the thermostat terminals. Refer to Figure 10-7.

The burner display screen should automatically go blank, as all power to the burner has been interrupted.

To make the burner operational again:

- Re-connect the lead.
- Refit the clip.



Figure 10-7: Disconnecting burn-back thermostat

10.5.2 Combustion Chamber Door Switch

When the burner display reads 'WAIT BOILER THERMOSTAT' check the operation of the combustion chamber door interlock as follows:

- The interlock is activated by opening the combustion chamber door.
- Operate the door catch and open the door.
- The burner display screen should automatically go blank, as all power to the burner has been interrupted.

To restart the display; close the door and fully engage the door catch to re-make the cut-out switch. Refer to Figure 10-8.

Closing the door will reconnect the power supply to the burner and the display will return, confirming that the door interlock is operating correctly.

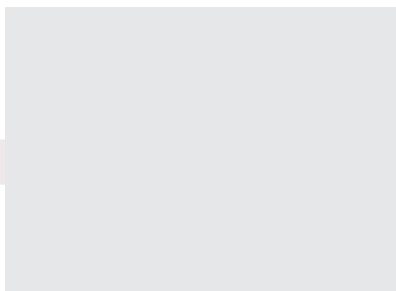


Figure 10-8: Combustion door catch



WARNING

The interlock on the combustion chamber door Interrupts the power supply to the burner if the door is opened. IT DOES NOT IMMEDIATELY EXTINGUISH THE BURNER FLAME. If the burner door is opened whilst the burner is firing, there can still be a large uncontrolled flame from the brazier.

10.6 Burner Settings

The boiler comes with the burner pre-set from the factory. However, the burner settings should be checked as part of the commissioning process and recorded on the Commissioning Report form. Refer to Section 10-12.

With the electrical power to the hopper and boiler Switched on, and the burner ON/STANDBY switch set to STANDBY, check that ALL burner settings in the 'INSTAL' (Installer) menu are as given in Section 9.6.

Refer to Section 9.7 for details of how to access and check these settings.

Set the boiler temperature set point using buttons 1 or 2 on the burner control panel. Refer to Section 1.1 for required flow and return temperatures.

10.7 Priming the Pellet Feed Auger

The pellet feed auger **MUST** be fully primed **BEFORE** attempting to start the boiler.

Prime the auger as follows:

- Disconnect the 6-way plug (No.3), from the pellet feed auger, from the upper socket on the left side of the burner. Refer to Figure 10-9.

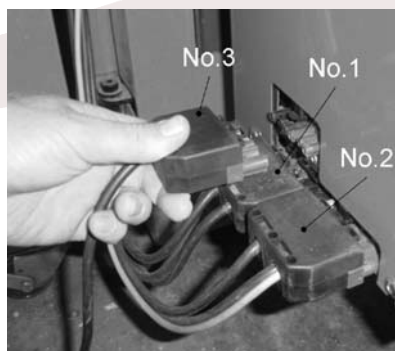


Figure 10-9: Pellet feed auger plug (3)

- Disconnect the 7-way plug (No.1) from the socket on the left side of the burner. Refer to Figure 10-9.
- Disconnect the pellet delivery hose from the pellet feed tube (on the burner) and place in a container of at least 1 litre capacity. Refer to Figure 10-10.



Figure 10-10: Pellet delivery hose

- Insert the 6-way plug into the 7-way plug. Refer to Figure 10-11. **It is not possible to connect these two plugs incorrectly as they will only fit together one way.** The feed pellet feed auger will now run continuously until the plug and socket is disconnected.

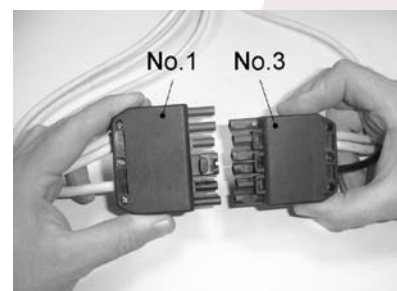


Figure 10-11: Connection of the two plugs

- Leave the auger running until there is a continuous flow of pellets from the pellet delivery hose. This will take between 15 to 20 minutes.
- Disconnect the two plugs from each other and the auger will stop. The pellet feed auger is now fully primed.
- Refit the pellet delivery hose onto the pellet feed tube of the burner.
- Check the condition of the pellet delivery hose and ensure it forms an air tight seal each end. Check for damage and replace if necessary.

10 Commissioning

A damaged pellet delivery hose can allow a back draught through the boiler resulting in the pellet tube (burn back) thermostat operating and shutting down the burner.

- Finally, re-fit both the 6-way and then 7-way plugs to their corresponding sockets on the left side of the burner. Ensure that both plugs are fully pushed home until the small catch clicks into place. Refer to Figure 10-9.

WARNING

Ensure the pellet delivery hose forms an air tight seal each end and that the hose is not damaged. Leakage of air could cause increased temperature in the pellet delivery hose and result in the burn-back thermostat shutting down the burner.

10.8 Lighting the Boiler

Ensure that the electrical supply to the hopper and boiler is switched on connected and that the heating system controls are operating and are calling for heat.

Set the burner ON/STANDBY switch to ON. The flue fan will start and pellets will be delivered to the burner.

Refer to Section 9.1 for details of the burner start-up, running and shut down sequences.

NOTE

If the boiler ON/STANDBY switch is set to STANDBY during the initial pellet pre-load period, the pellet feed will continue until the pre-load is complete. The burner will then complete the shut-down sequence before it can start-up again, even if the ON/STANDBY switch is reset to ON.

If the ON/STANDBY switch is set to STANDBY during the start-up sequence, but AFTER the pre-load is finished, then the burner will immediately enter and complete the shut-down sequence before it can start-up again, even if the ON/STANDBY switch is reset to ON.

After completing the start-up sequence, the burner should be firing at maximum output and the display on the burner control shows 'BURNER FIRING 100%'.

10.9 Combustion Chamber Draught

10.9.1 Burn Back Thermostat

The combustion chamber draught must be checked and adjusted (where necessary) as follows:

- Allow the boiler to run for a period of 15 minutes, until the boiler and flue system are warmed up.
- Ensure the burner display is showing 'BURNER FIRING 100%'.
- Remove the screw from the draught test point, located to the left of the burner on the combustion chamber door. Refer to Figure 10-12.
- After setting the zero on the draught gauge, insert the end of the draught gauge sample tube into the test point on the door. Ensure that it is pushed through the door insulation and into the combustion chamber.
- A draught reading of between 0.1 and 0.15mbar is required (0.04 and 0.06 in.wg).



Figure 10-12: Draught test point

10.9.2 Draught Stabiliser Adjustment

To adjust the combustion chamber draught reading, re-position the weight on the stabiliser door arm as follows:

- To increase draught – move the weight away from the damper (or add extra weights if necessary – see right).
- To decrease draught – move the weight closer to the damper. Refer to Figure 10-13.



Figure 10-13: Draught stabiliser arm

If it is necessary to increase the draught, but the weight fitted is already at the end of the damper arm, extra slotted disc weights (supplied with the boiler) can be used.

These weights are fitted on the 'flue end' of the damper arm, as follows:

- Slacken the grub screw and slide the fitted weight along the arm towards the damper.
- Fit one of the slotted weights onto the arm.
- Secure by inserting a flat bladed screwdriver into the slot and twisting it. Refer to Figure 10-14.
- Slide both the weights to the end of the shaft and secure by tightening the grub screw in the fitted weight. Refer to Figure 10-15.

Repeat this process as necessary to achieve the required draught.



Figure 10-14: Fitting slotted disc weight



Figure 10-15: Draught stabiliser weights

10.9.3 Fan Box SliderPlate

If the combustion chamber draught is too high, and adjustment of the draught stabiliser alone cannot bring it within the required range of 0.1 to 0.15mbar (0.04 and 0.06 in.wg), it may be necessary to adjust the setting of the fan box slider plate.

This is located within the fan box and is supplied set fully closed.

Opening this slider plate allows some of the flue gases to by-pass the flue fan, and reduces the combustion chamber draught. Refer to Figure 10-16.

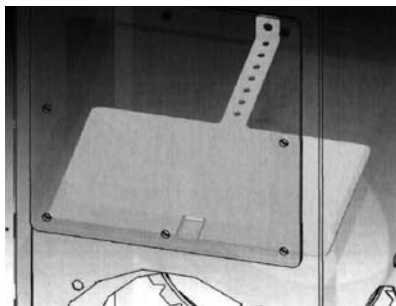


Figure 10-16: Fan box slider plate

If required, adjust the slider plate as follows:

- With the boiler firing at maximum output and the burner display is showing '**BURNER FIRING 100%**'.
- Set the draught stabiliser weight midway on the damper arm.
- Unscrew and remove the single screw securing the end of the slider plate arm.
- This screw is located on the right hand side of the fan box - immediately above the draught stabiliser.
- Carefully pull out the end of the slider arm whilst monitoring the combustion chamber draught on the draught gauge.
- When the draught gauge indicates a draught midway between 0.1 to 0.15mbar the slider position is correct.
- Without moving the position of the slider plate, bend up the end of the slider arm so the nearest hole in the arm lines up with the threaded hole in the fan box.
- Secure the slider arm to the fan box using the screw previously removed.

- If necessary make any fine adjustment of the combustion chamber draught by altering the position of the weight on the damper arm.



NOTE

The normal means of setting the correct combustion chamber draught is by adjusting the position of the damper weight, as detailed in Section 10.9.2.

ONLY adjust the slider plate when absolute necessary, i.e. when the draught reading is too high and beyond the adjustment range of the damper weight.

10.10 Flue Gas Analysis

Check the %CO₂ in the flue gases as follows:

- Ensure the burner display is showing '**BURNER FIRING 100%**'.
- Remove the screw from the combustion test point, located at the left rear corner of the rear access cover (on the secondary heat exchanger). Refer to Figure 10-17.
- Insert the analyser probe a minimum of 100mm into the test point.
- Monitor the %CO₂ for a few minutes to see the maximum and minimum values reached.
- The %CO₂ measured should range between a maximum of 12% and a minimum of 10%.

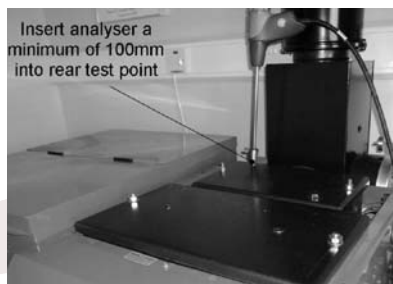


Figure 10-17: Combustion test point

If necessary the %CO₂ may have to be adjusted to be within these limits, as follows:

- Access the '**INSTAL**' (Installer) menu in the burner control settings and go to the '**SETUP FAN**' sub menu.

- Go to the '**POWER MAXIMUM**' value and adjust the burner fan speed using buttons 5 and 6 on the burner control panel. Refer to Section 9.4.
- To decrease the %CO₂ – increase the fan speed using button 6.
- To increase the %CO₂ – decrease the fan speed using button 5.
- To confirm the change in the '**POWER MAXIMUM**' fan setting, press button 4 twice, to exit the '**SETUP FAN**' and '**INSTAL**' menus and return to the normal control panel display (showing H2o and SET temperature).
- Monitor the %CO₂ for a few minutes to see if the maximum and minimum values are 12% and 10% as required.
- If necessary make a further adjustment of the fan speed and check the resulting %CO₂ as described above, until it remains within the required maximum and minimum limits.
- Record the maximum and minimum values on the Commissioning Report form. Refer to Section 10.12.



NOTE

It is essential to continue to monitor the combustion chamber draught, whilst adjusting the CO₂ in the flue gases, and to adjust the draught stabiliser to keep it within the required limits. Refer to Section 10.9.

On double boiler installations, the above process – as covered in Sections 10.3 to 10.10 – must be fully carried out on BOTH boilers.

10.11 Customer Handover

The customer/user must be informed of the correct operation and use of their Grant Spira wood pellet boiler installation. This must include the following information:

- The use of the boiler controls – how to switch the boiler off and on, as required. Refer customer to the User Instructions at the back of this manual.

10 Commissioning

- The use of the heating system controls – how to set the programmer, room and cylinder thermostats, etc.
- The importance of using the correct type of wood pellet.
- The need to routinely check the pellet level in the pellet hopper and how to re-fill it (hopper only installations)
- The need to routinely check the pellet level in the bulk pellet store (bulk pellet store installations only).
- How to access the ash pan and the need to periodically empty the ash pan. Refer to Section 1.5 and the User instructions.
- The need to have the boiler serviced either annually or when 'SERVICE' is shown on the burner control panel display (whichever comes first). Refer to Section 1.5 and User Instructions.
- That servicing should only be carried out by a Grant Approved installer.

10.12 Commissioning Report Form

The Commissioning Report form (supplied with the boiler) must be completed at the end of the commissioning process. Refer to Section 4.7.

For a double boiler installation, a commissioning form must be completed for each of the two boilers.

The following information must be entered on the form:

- Boiler details (model, serial No., etc.)
- Combustion readings
- Installation details
- Burner settings
- Customer handover details

The completed form must be signed by both installer and customer/user.

A copy of the completed form must be left with the customer/user, one must be returned to Grant UK and the remaining third copy retained by the Installer.

10.13 Commissioning Check List

The following checklist must be used in conjunction with the preceding information given in this section:

Preliminary Inspection	Tick box
Heating system	<input type="checkbox"/>
Electrical connections	<input type="checkbox"/>
Condensate disposal	<input type="checkbox"/>
Flue system	<input type="checkbox"/>
Combustion ventilation	<input type="checkbox"/>
Boiler	
Control panel	<input type="checkbox"/>
Combustion chamber	<input type="checkbox"/>
Heat exchangers – primary	<input type="checkbox"/>
Heat exchangers – secondary	<input type="checkbox"/>
Pellet Hopper	
Auger	<input type="checkbox"/>
Pellets	<input type="checkbox"/>
Safety Device Checks	
Burn-back thermostat	<input type="checkbox"/>
Combustion chamber door switch	<input type="checkbox"/>
Priming Pellet Feed Auger	<input type="checkbox"/>
Lighting the Boiler	<input type="checkbox"/>
Combustion Chamber Draught	<input type="checkbox"/>
Flue Gas Analysis	<input type="checkbox"/>
Customer Handover	<input type="checkbox"/>
Commissioning Report Form	<input type="checkbox"/>

11 Boiler Servicing

11.1 General

It is essential that the Grant Spira boiler is serviced at regular intervals of no longer than 12 months OR when the 'SERVICE' is shown on the burner control panel display.

The burner will automatically indicate 'SERVICE' on the burner control panel display once the pre-set period of pellet feed auger run time ('HOURS SERVICE') is achieved. Refer to Section 9.7 for details on how to access and check this setting in the 'INSTAL CLEAN' sub-menu of the burner settings.

This interval is based on the auger running time, i.e. the actual quantity of pellets used based on the pellet feed auger rate and pellet delivery settings. Refer to Section 9.7 for details on how to access and check this setting in the 'POWER PELLET' sub-menu of the burner settings.

The ash pan (located inside the combustion chamber) will need to be periodically emptied. This simple task must be carried out by the user at **MONTHLY** intervals for the **FIRST THREE MONTHS**. Thereafter, the ash pan should be emptied regularly, on at least a monthly basis, or as indicated by the amount of ash found during the first three months. Two carrying handles are supplied with the boiler to allow removal of the ash pan when hot.

Servicing and replacement of parts must only be carried out by a Grant Approved installer who has successfully completed the Grant Spira wood pellet boiler training course.

! NOTE

Details of every service should be entered in the Service log at the front of this manual.

! WARNING

Before starting any work on the boiler, or on the pellet storage and supply installation, please read the health and safety information in Section 15.

11.2 Checks Before Servicing

BEFORE starting any service work on the boiler or pellet storage/supply installation:

- Set the **ON/STANDBY** switch, on the boiler control panel, to **STANDBY**. If the boiler was operating, wait for it to shut-down and 'WAIT BOILER THERMOSTAT' is shown on the burner control panel display before proceeding further.
- Isolate the electrical supply to the hopper and boiler and remove the 5A fuse from the fused spur.
- Disconnect the 5-way plug (on the lead from the hopper) from the socket at the left rear of the boiler. Refer to Figure 11-1.
- If a double boiler installation, remove the 5-way plug from both boilers.
- Disconnect the 5-way plug (on the lead from the flue fan and solenoid) from the socket at the right rear of the boiler. Refer to Figure 11-2.

This will allow the hopper to be moved to give easy access to the rear of the boiler for servicing.



Figure 11-1: Disconnecting hopper 5-way plug



Figure 11-2: Disconnecting fan 5-way plug

11.3 Heating System

If boiler is part of a sealed heating system, check the following:

- System pressure
- Pressure relief valve operation
- Expansion vessel air charge pressure (when the system pressure is zero)

Check the boiler for any indication of leaks from:

- Flow and return connections
- Automatic air vent (at rear of boiler)
- Drain cock (at lower rear of boiler)

Remake any joints and re-check tightness of any fitting that may be leaking.

Re-fill and vent the system to the required pressure. Refer to Section 6.

On either sealed or open-vented systems:

- Inspect and clean the in-line magnetic filter in accordance with the filter manufacturer's instructions.
- Ensure that adequate corrosion protection is present in system.

11.4 Flue System

11.4.1 Flue Terminal

Check the flue terminal and ensure that it is not blocked or damaged.

11.4.2 Fan Box

Unscrew the eight screws securing the flue inspection plate on to the fan box and remove the plate. Inspect inside of both flue and fan box. Refer to Figure 11-3. Clean any ash deposits from the inside of the fan box, as necessary.

Clean the flue by sweeping, as required.

Replace plate and secure using the eight screws, ensuring that it is correctly sealed to the fan box on the neoprene gasket.

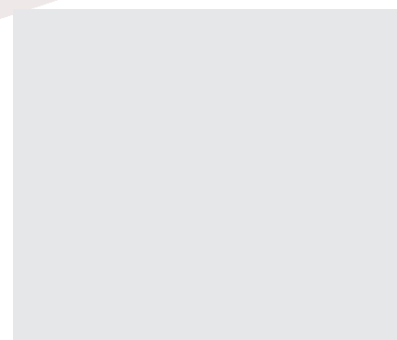


Figure 11-3: Fan box inspection opening

11 Boiler Servicing

11.4.3 Draught Stabiliser

Check draught stabiliser damper is free to move. Remove draught stabiliser from fan box and clean if required. Refer to Figure 11-2.

Re-fit draught stabiliser to fan box and check damper is free to move.

Draught stabiliser setting must be checked when boiler is operational. Refer to Section 11.9.

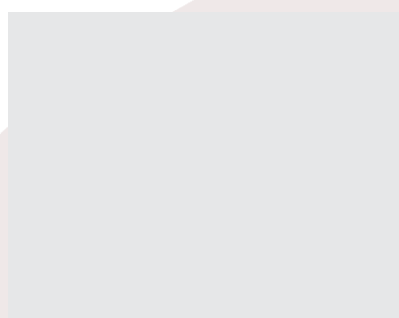


Figure 11-4: Draught stabiliser

11.4.4 Flue Fan

Unscrew the four screws securing the flue fan to the fan box and remove the fan. Clean any ash deposits from the fan blades and mounting plate. Refer to Figure 11-3.

Refit fan to fan box and secure with screws. Ensure that it is correctly sealed to the fan box on the neoprene gasket.

Refit the 5-way (on the lead from the flue fan and solenoid) into the socket at the right rear of the boiler. Refer to Figure 11-2.



When cleaning the fan blades ensure they are all thoroughly cleaned. Uneven cleaning will result in the fan being 'out of balance' and could cause damage to the fan motor.

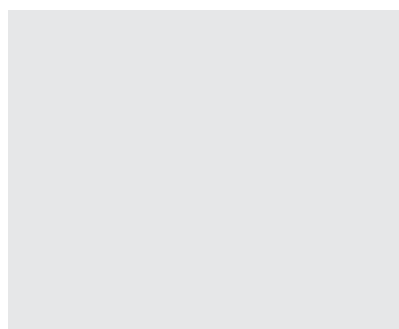


Figure 11-5: Flue fan



Failure to maintain a clean flue can result in the emission of flue gases into the dwelling or damage from potential fire in the flue.

11.5 Combustion Ventilation

Check that the combustion air supply conforms to the relevant requirements of The Building Regulations Approved Document J, for solid fuel appliances with a draught stabiliser. Refer to Section 6.1.

Check that all ventilation openings are free from any obstructions, both inside and outside. If necessary remove any blockages (e.g. fluff, dog hair, leaves, etc.).

11.6 Boiler

11.6.1 Contro Panel



Ensure the electrical supply to the hopper and boiler is isolated by disconnecting the 4-way plug from the socket (on the flying lead) at the rear of the hopper.

Unscrew and remove the six self tapping screws securing the boiler control panel cover and lift the cover off the control panel.

Proceed as follows:

- Check both the overheat thermostat probe and thermistor bulb are fully inserted in the boiler waterway pocket, and the retaining clip is fitted. Refer to Figure 11-6.
- Check the condition of thermistor cable and thermostat capillary, i.e. not damaged, broken or kinked.
- Grease the edge of the shaker motor cam with high temperature grease. Refer to Figure 11-7.

Refit the control panel cover and secure with the six screws previously removed.

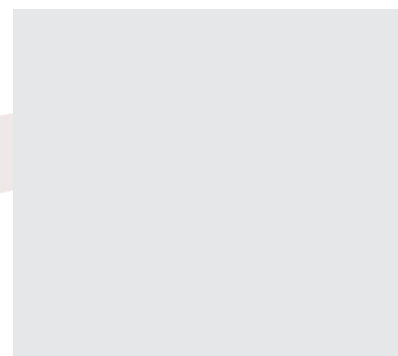


Figure 11-6: Boiler control panel (cover removed)

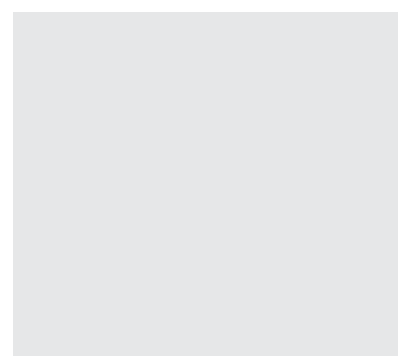


Figure 11-7: Shaker motor cam location

11.6.2 Heat exchangers

To gain access to the top of both heat exchangers. (Refer to Figure 11-7):

- Remove the boiler top casing panel.
- Unscrew and remove the two nuts securing the front access panel and remove it from the top of the primary heat exchanger.
- Unscrew and remove the two nuts securing the rear access cover and remove it from top of the secondary (condensing) heat exchanger.

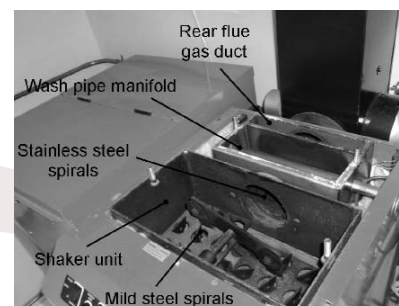


Figure 11-8: Top of heat exchangers

Operate the automatic cleaning function in both heat exchangers, as follows:

- Set the **ON/STANDBY** switch to **STANDBY**.
- Re-fit the 5-way plug (on the lead from the hopper) into the socket at the left rear of the boiler. Refer to Figure 11-1.
- Replace the 5A fuse in the fused spur and switch on the electrical supply to the hopper and boiler. The burner fan should briefly run.
- Press and hold down the '**CLEANING**' switch, on the boiler control panel, in the '**TEST**' position for about 60 seconds.
- Release switch to automatically reset cleaning function back to '**AUTO**'.

Note that setting this switch to 'TEST' does NOT operate the burner cleaning function, but only that of the two heat exchangers.

Ensure the electrical supply to the hopper and boiler is isolated by disconnecting the 4-way plug from the socket (on the flying lead) at the rear of the hopper.

Primary heat exchanger – clean as follows:

- Remove all of the mild steel spirals by lifting them vertically up and out from the primary heat exchanger tubes.
- Clean down any ash inside tubes, using a suitable pipe brush, into the combustion chamber and ash pan below.
- Clean all ash deposits from top chamber of the primary heat exchanger (above tubes) and shaker mechanism/plates, using brush and vacuum.
- Clean and check condition of all spiral baffles.
- Re-fit spiral baffles into heat exchanger tubes, fitting them through shaker plates.
- Lift and drop each spiral to check that all spirals are free to move in their respective tubes.

Secondary heat exchanger – clean as follows:

- Shut off cold water supply to wash system manifold.

- Remove the securing clip from the end of the solenoid valve shaft. Then separate solenoid head from valve body.
- Unscrew the two screws securing the manifold pipe flange to the boiler side panel.
- Carefully remove the wash system manifold pipe through the side of the secondary heat exchanger and boiler.
- Check and clean the manifold tube thoroughly, ensuring that all the jets are clear. Rinse inside of manifold pipe to ensure all ash deposits and other debris is removed.
- Remove all of the stainless steel spirals from the secondary heat exchanger tubes.
- Clean down any ash inside tubes, using a suitable pipe brush, into the base of the condensing heat exchanger below.
- Clean all ash deposits from top chamber of secondary heat exchanger (above tubes) and from rear flue gas duct (at rear of secondary heat exchanger) using brush and vacuum.
- Clean and check condition of all spiral baffles. Replace if necessary.
- Re-fit baffles into heat exchanger tubes, such that all the top edges of the baffles are running 'front to back'. Refer to Figure 11-5.
- Re-fit wash system manifold tube using the two screws previously removed, but do not tighten at this stage (the wash system manifold needs to be correctly aligned once the boiler power supply is reconnected).
- Re-fit solenoid head to valve body and secure in place with the spring clip.

Test the automatic cleaning functions as follows:

- Check the **ON/STANDBY** switch is set to **STANDBY**.
- Re-connect the electrical supply to the hopper and boiler by fitting the 4-way plug into the socket (on the flying lead) at the rear of the hopper. The burner fan should briefly run.

- Press and hold down the '**CLEANING**' '**TEST**' switch on the boiler control panel.



WARNING

Ensure that fingers are clear of all moving parts inside the top of the primary heat exchanger BEFORE operating 'CLEANING TEST' switch.

Primary Heat Exchanger

Check the shaker unit (located in the top of the primary heat exchanger) is operating freely and that the spirals are moving up and down with two intermittent vertical motions.

If there is no movement of the shaker system, isolate the electrical supply and check that:

- the motor and cam is rotating.
- the cam follower is in contact with the cam.
- the condition of the cam follower spring (located in the rear of the control panel). Replace if necessary.

Secondary heat exchanger

Check the wash system manifold (located under the top rear access door) is spraying water directly into each flue gas tube of the unit. Refer to Figure 11-4.

If the water jets are not spraying directly into the flue gas tubes, adjust the spray as follows:

- Slacken the two screws securing the manifold pipe flange to the boiler side panel.
- Carefully rotate the pipe until jets spray directly into tubes.
- Tighten the two screws to secure manifold pipe in this position.

Inspect the condition of the two access panels before re-fitting. Replace any damaged or worn rope seal or gaskets if necessary.

Refit both front and rear access panels and secure with the nuts previously removed. Do not overtighten.

Ensure that the rear access panel is fitted with the flue gas sample point in the rear left hand corner.

11 Boiler Servicing

11.6.3 Combustion Chamber



WARNING

Ensure the electrical supply to the hopper and boiler is isolated by disconnecting the 4-way plug from the socket (on the flying lead) at the rear of the hopper, before proceeding.

Disconnect the pellet delivery hose from the burner pellet feed tube. Then fully open the combustion chamber door on the front of the boiler and clean as follows:

- Before moving the combustion chamber baffle (located in the top of the combustion chamber) remove all ash deposits from the upper surface using a vacuum. Refer to Figure 11-8.
- Remove and inspect the baffle and clean off any remaining deposits using a brush and vacuum.
- Check the baffle condition and replace if necessary.
- Clean the underside of upper rear section of the primary heat exchanger (at the rear of combustion chamber) BEFORE replacing baffle.

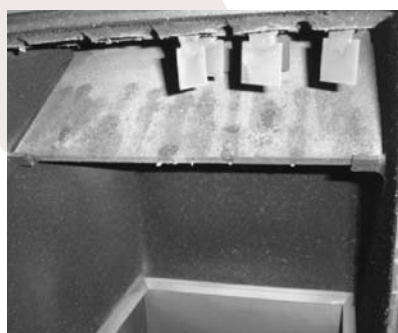


Figure 11-9: Combustion chamber baffle



CAUTION

Extreme care is required when emptying the ash pan as smouldering ash could be present and cause serious damage to persons or property. Ensure the ash is disposed of in a safe manner.

- Clean down the combustion chamber side, back and base surfaces, removing all ash deposits.
- Clean any ash deposits from the top of the burner hood and the inner face of the combustion chamber door.
- Clean out the burner brazier to remove as much loose ash as possible using a vacuum.
- Refit the combustion chamber baffle in position ensuring it is seated correctly on the fixing brackets. Refer to Figure 11-8.
- Refit the ash pan in the base of the combustion chamber.
- Grease the front cleaning door latch mechanism and close the door.

11.7 Burner Brazier



WARNING

Ensure that electrical supply to the hopper and boiler is isolated by disconnecting at the 4-way plug from the socket (on the flying lead) at the rear of the hopper, before proceeding.

11.7.1 Removal of Burner

To clean the burner thoroughly it will be necessary to remove it from the boiler, as follows:

- Disconnect the three plugs from the left side of the burner. Refer to Figure 11-9.

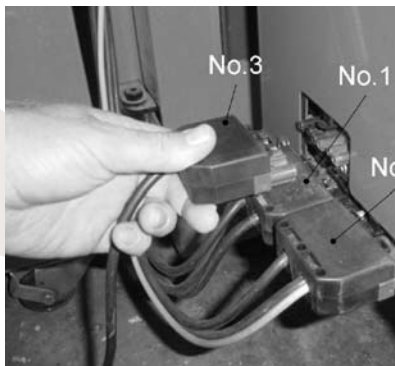


Figure 11-10: Burner plugs

- Remove the steel clip from the burn back thermostat (on the pellet feed pipe) and disconnect the lead from the thermostat terminals.

- Remove the red burner cover by loosening the four M5 screws (two each side of the cover) and lifting it off the burner.
- Whilst supporting the burner, unscrew and remove the two M8 burner securing nuts, one on each side of the burner. Refer to Figure 11-10.

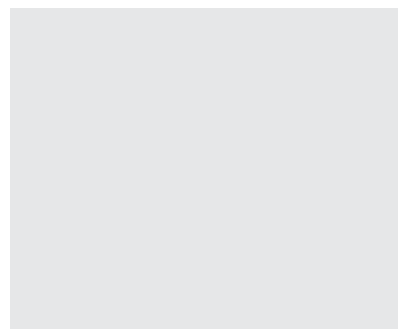


Figure 11-11: Burner fixing nuts

- Carefully withdraw the burner from the combustion chamber door taking care not to damage the burner door gasket.
- Place the burner on a suitable bench (e.g. portable 'workmate' type bench or similar) to work on.

11.7.2 Cleaning Burner Brazier

Dismantle and clean the burner as follows:

- Remove the burner hood by loosening the two M5 bolts (highlighted below) each side of the brazier. Slide the forwards and then up to disengage the hood from the burner. Refer to Figure 11-11.

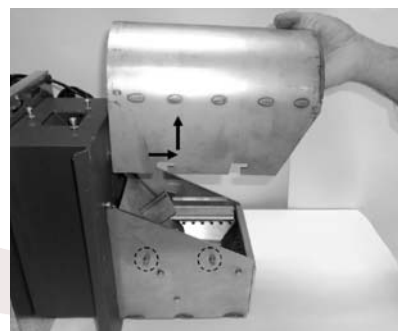


Figure 11-12: Removal of burner hood

- Clean and inspect the hood for any damage or distortion. Replace if necessary. Remove all ash deposits and check that all air holes (on the inside surface of the hood) are clear.



NOTE

After a period of time in use, the semi circular end wall of the brazier hood may distort or show minor cracks. This does not affect the operation of the burner. The hood should only be changed if there is considerably deterioration.

- Open the brazier manually by operating the release switch on the servo motor and carefully pulling on the end wall of the brazier.
- To operate the switch and release the motor, either press and hold down the switch down or lift and hold the switch up – depending on motor type used. Refer to Figure 11-12.

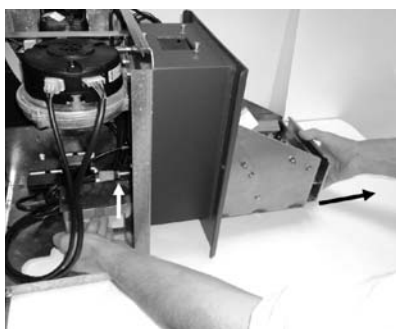


Figure 11-13: Manual opening of brazier



WARNING

DO NOT ATTEMPT TO FORCE THE BRAZIER OPEN WITHOUT OPERATING THE SERVO MOTOR RELEASE SWITCH.

Failure to operate the servo motor release switch **WILL** result in damage to the servo motor gears.

With the brazier open, dismantle the brazier to thoroughly clean all parts as follows, referring to Figure 13-2:

- Unscrew and remove the upper two M6 nuts and washers on either side of the brazier chassis, securing the two brazier flame plates.
- Remove the four M6 screws from the inside of the brazier.
- Unscrew and remove the two M6 screws securing the photocell back plate to the burner.
- Remove both the two brazier flame plates and photocell back plate from brazier.
- Unscrew and remove the two M6 nuts and washers on either side of the brazier chassis securing the 3-sided grate enclosure.
- Remove the four M6 screws from inside the brazier and remove the grate enclosure.
- Unscrew and remove the two M6 screws and washers (one each side of the brazier chassis) securing the ignition element mounting plate, and remove it from the brazier chassis.
- From below the burner, unscrew and remove the single cap screw attaching the push rod of the moveable brazier base to the shaft of the servo motor.
- Disengage the push rod from the motor shaft and remove brazier base assembly from the brazier chassis.

Inspect all components for distortion or damage and replace if necessary.

Clean all ash and clinker deposits from all surfaces (in particular the upper surface of the brazier chassis and the underside of the brazier base assembly) using wire brush and, where necessary, a flat scraper.

Ensure that all air holes are clear.

Reassemble the brazier using the following procedure:

- Fit the moveable brazier base assembly to the burner and reconnect the pushrod to the motor shaft using the cap screw.
- Whilst operating the servo motor release switch, push the brazier base assembly fully back into the brazier chassis.
- Insert the brazier clearance gauge plate (supplied with the boiler) between the brazier chassis and brazier base assembly. Refer to Figure 11-13.
- The clearance gauge should slide in using manual force only. **DO NOT FORCE THE GAUGE INTO THE BRAZIER!**
- Reassemble the remainder of the brazier, using the reverse of the dismantling procedure.
- Leave all screws loose until all components (excluding the burner hood) are assembled correctly.

- **BEFORE** fitting the burner hood, tighten the two screws securing the photocell back plate to the front of the burner.
- Fit the burner hood and then finally tighten all remaining burner fixings.
- Remove brazier clearance gauge from burner brazier.
- Operate servo motor release switch and manually open and close brazier to check it is free to move.

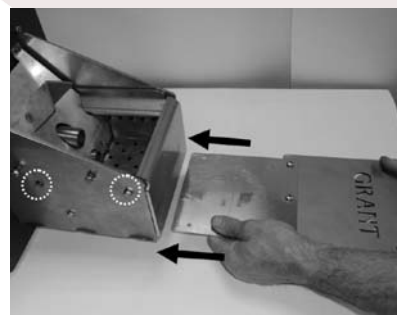


Figure 11-14: Fitting brazier clearance gauge

11.8 Burner Components

Check the burner fan inlet is clear of debris.

If there is a build-up of debris remove the burner fan and clean the fan blades and fan housing. Refer to Figure 11-14.

11.8.1 Burner Fan

Check the burner fan inlet is clear of debris. If there is a build-up of debris remove the burner fan and clean the fan blades and fan housing. Refer to Figure 11-14.

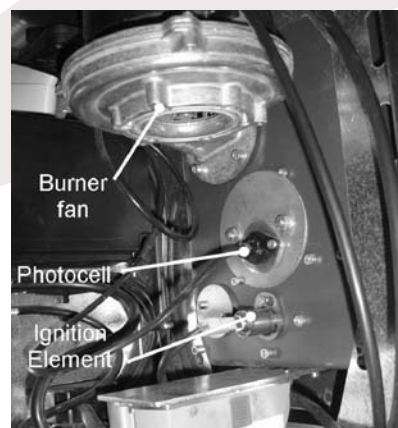


Figure 11-15: Interior of burner enclosure

11 Boiler Servicing

11.8.2 Photocell

Remove photocell from mount. Check and clean the photocell. Replace if damaged. Refer to Figure 11-14.

Remove the two screws securing the photocell mount and pull out the photocell tube. Check the condition and thoroughly clean the inside of the tube. Refit tube to burner.

Ensure the photocell clamp is fitted 25mm from end as shown in Figure 11-15. Refit into photocell mount



Figure 11-16: Photocell clamp position

11.8.3 Ignition Element

Remove and check the condition of the ceramic heating element. Replace if damaged.

To remove the element from the tube, grasp the black grommet and pull out of the tube. Do NOT pull on the element power cable.

Unscrew and remove the single screw securing the ignition element tube and pull it out of the burner.

Check the condition and thoroughly clean the inside of the tube. Replace the tube in the burner and secure with the screw.

Check that the ceramic element is correctly fitted into the ceramic socket.

Replace the ignition element in the tube, ensuring that the element is correctly positioned inside the tube. Refer to Figure 11-16.

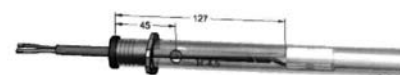


Figure 11-17: Ceramic ignition element

11.8.4 Pellet Feed Tube

Unscrew the three fixing screws and remove the feed pipe and gasket from the top of the burner.

Check the condition of the gasket and replace if necessary.

Check the condition of the feed tube and thoroughly clean the inside.

Check that the burn back thermostat is correctly mounted and fixed to the top of the tube.

Replace on burner, ensuring gasket is correctly fitted, and secure with the three screws

11.9 Re-fitting Burner

Before re-fitting the burner, check the condition of the burner door gasket. Replace if necessary.

With the gasket correctly located, re-fit the burner to the combustion chamber door. Carefully insert the burner brazier through the opening and locate the holes in the burner flange onto the M8 studs (on either side of the burner).

Secure the burner to the door with the two M8 nuts previously removed.

Re-connect the three plugs to their corresponding sockets on the left side of the burner. Ensure that each plug is fully pushed home until the small catch clicks into place. Refer to Figure 11-9.

Check the condition of the pellet delivery hose and ensure it forms an air tight seal each end.

Check for any damage to the hose and replace if necessary.

A damaged pellet delivery hose can allow a back draught through the boiler, resulting in the pellet tube (burn back) thermostat operating and shutting down the burner.

11.10 Condensate Disposal System

11.10.1 Condensate Trap

Disconnect the condensate disposal system from the outlet at the back of the boiler. Check that the boiler condensate outlet is clear. Remove any blockage or ash build-up.

Remove the condensate trap (supplied with the boiler) from the condensate disposal system. Dismantle and check the condition of the trap.

Thoroughly clean out the trap to remove any deposits and re-fit to condensate disposal system.

Reconnect the disposal system to boiler outlet.



NOTE

The condensate trap(s) and condensate outlet MUST be checked on EVERY service and cleaned as necessary. Failure to regularly check and clean the condensate trap (or traps) may result in damage to the boiler and this will not be covered by the product warranty.

11.10.2 Condensate Disposal Pipe

Check entire length of discharge pipe, for any leaks or blockages. Clean or replace as necessary.

Check any other traps in the condensate disposal pipework. Dismantle and thoroughly clean to remove any deposits. Re-fit to condensate disposal system pipework.

Check that any outlets to a gully or hopper are not obstructed. Remove any blockages.

11.10.3 Burner Settings

If a condensate pump is fitted to the system, check:

- The condition of the holding tank. Thoroughly clean to remove any deposits.
- Operation of the overflow cut-out float switch.
- The pump is operating correctly.

11.11 Burner Settings

With the electrical power to the hopper and boiler Switched on, and the burner **ON/STANDBY** switch set to **STANDBY**, check that **ALL** burner settings in the 'INSTAL' (Installer) menu are as given in Section 9.6.

Check the burner control settings match those set on commissioning (i.e. as recorded on the Commissioning Report form), a copy of which was left with the householder/user.

Refer to Section 9.7 for details of how to access and check these settings.

Reset the SERVICE timer as follows:

- Go to the 'CLEAN' sub menu in the installer ('INSTAL') menu
- Go to the 'RESET SERVICE' setting.
- Press button 3 to reset timer to zero.

Refer to Section 9.7.1.3 for further details on settings.

11.12 Safety Device Checks

The following safety checks must be made before putting the boiler back into operation:

11.12.1 Burn Back Thermostat

Check operation of burn back thermostat. Follow the procedure given in Section 10.5.1

11.12.2 Combustion Chamber Door Switch

Check operation of combustion chamber door switch. Follow the procedure given in Section 10.5.2.

11.13 Combustion Checks

To ensure safe and efficient operation of the boiler, it is essential that the boiler combustion is re-checked and adjusted as necessary.

11.13.1 Combustion Chamber Draught

Check the combustion chamber draught, and adjust the draught stabiliser setting as required. Follow the procedure given in Section 9.9.

11.13.2 Flue Gas Analysis

Check the %CO₂ in the flue gases and adjust the burner fan setting as required. Follow the procedure given in Section 10.10.



To ensure safe and efficient operation of the boiler it is important that boiler/burner is re-commissioning as detailed in Section 10.

12 Fault Finding

12.1 General

If a fault occurs with the boiler, the display screen on the burner control panel helps to identify the nature and cause of that fault.

There are **THREE** basic screen displays that can be seen in the event of a fault, as follows:

- a) Normal screen display (with WAIT BOILER THERMOSTAT continuously scrolling across the lower part of the screen). Refer to Figure 12-1.

If this is the case go to **Section 12.2** for fault finding procedure.

- b) No display – screen is BLANK. Refer to Figure 12-2.

If this is the case go to **Section 12.3** for fault finding procedure.

- c) An **ERROR** message is displayed.

If this is the case refer to '**Error Messages**' below.

It is essential, at this stage, to check and identify which of these three displays is shown on the burner control panel screen, before proceeding to attempt to diagnose the fault.

Error Messages

There are **FOUR** possible error messages that can be displayed on the burner control panel screen in the event of a fault. In all cases the cursor will be next to the error symbol (at the lower left corner of the display). Refer to Figure 12-3.

The four possible error messages that can be displayed (continuously scrolling across the lower part of the screen) are listed below. Each one identifies a particular fault. Refer to the relevant section of this manual for detailed guidance to diagnose and rectify the fault, as follows:

- FAILED PELLET LIGHTING -
Go to **Section 12.6**
- SERVO MOTOR BLOCKED -
Go to **Section 12.7**
- PROBE FAULT -
Go to **Section 12.8**
- AIR PRESSURE ERROR -
Go to **Section 12.9**



Figure 12-1: Normal screen display

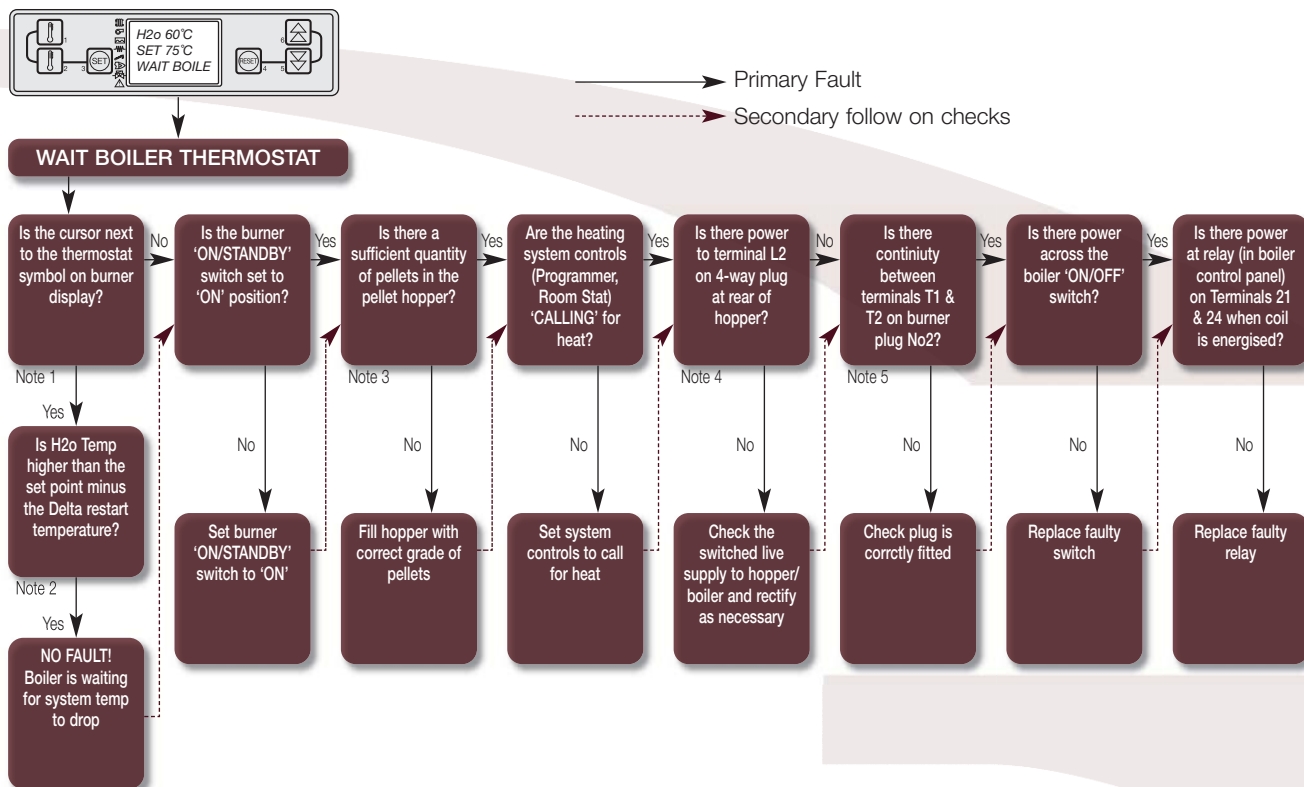


Figure 12-2: Blank screen display



Figure 12-3: Error message screen display

12.2 Normal Screen Display - Boiler will not fire – but NO error message is displayed



Note 1 - Is the cursor next to the thermostat symbol on the burner display?

When there is a switched live supply to the burner (i.e. when the heating system controls are 'calling' and the ON/STANDBY switch is set to ON), the burner screen display shows a cursor highlighted next to the boiler thermostat symbol. Refer to Figure 12-4.



Figure 12-4: Burner screen display

Note 2 - Is the boiler above 'DELTA RESTART' temperature?

If the boiler has exceeded the 'TEMP OF H₂O' setting (80°C) the boiler will shut down. The boiler temperature will have to fall to below the 'DELTA RESTART' value (5°C below the boiler set point temperature) before it can start again. Refer to Section 9.1.

Note 3 - Is there a sufficient quantity of pellets in the pellet hopper?

The effect of insufficient pellets will depend on the type of pellet storage used, as follows:

Using a pellet hopper only – if there are insufficient pellets, the hopper contents switch will break the switched live to the boiler, causing 'WAIT BOILER THERMOSTAT' to be displayed. Refill the hopper to start the boiler. Refer to Section 1.4.4 for further details.

Using a bulk pellet store – the hopper contents switch will control the operation of either the bulk store auger of Grant Spira-vac system. It will NOT interrupt the switched live to the boiler and thus 'WAIT BOILER THERMOSTAT' will NOT be displayed. The boiler would continue to operate until ALL pellets in the hopper are used and then stop, with 'FAILED PELLET LIGHTING' displayed on the burner control screen.

In this case, check that:

- there are pellets in the bulk store

- the bulk store auger, or Grant Spira-vac system, is operating correctly (refer to instructions supplied with the Spira-vac system).

Rectify as necessary.

Note 4 - Is there a switched live from the heating system controls connected to the hopper/boiler?

Check that switched live from the controls is correctly connected to terminal L2 on the 4-way plug at the rear of the hopper. Also check that this 4-way plug is fully pushed into the socket on the flying lead, at the rear of the hopper. Refer to Sections 8.4 and 8.5 for further details.

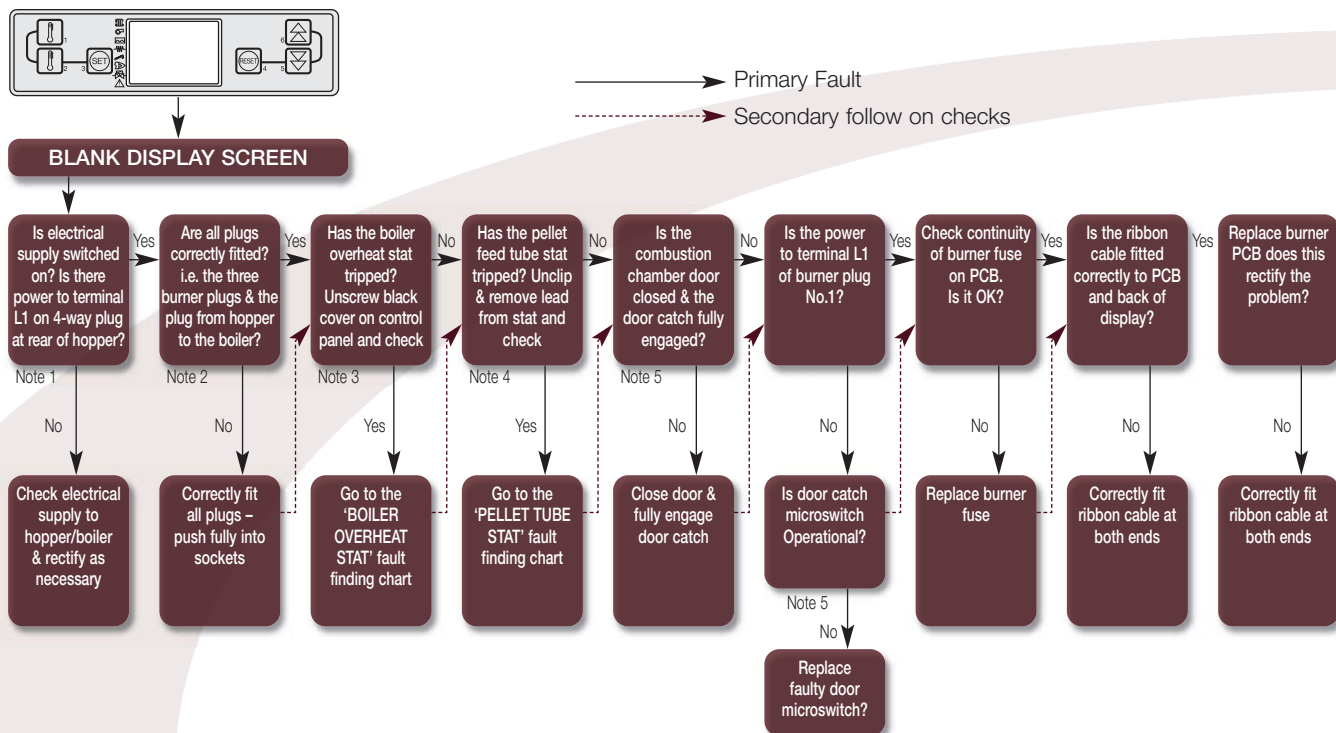
Check that ALL controls (programmer and room thermostats) are 'calling' and that there is a 230V output to the boiler.

Note 5 - Is there continuity between terminals T1 and T2 on burner plug No.2?

Disconnect the plug from left side of burner and check for continuity between terminals T1 and T2. Refer to Figure 8-5 for wiring details.

12 Fault Finding

12.3 No Screen Display - Boiler will not fire – blank screen



Note 1 - Is there a permanent mains live supply connected to the hopper/boiler?

Check that the permanent live from the fused spur is correctly connected to terminal L1 on the 4-way plug at the rear of the hopper. Also check that 4-way plug is fully pushed into the socket on the flying lead, at the rear of the hopper. Refer to Sections 8.4 and 8.5 for further details.

Also check that 5-way plug from hopper is fully pushed into the socket at the top left rear of the boiler.

Check that the fused spur is switched ON and, if necessary, check the fuse is OK.

Note 2 - Is there a permanent mains live supply connected to the burner?

Check that the two 7-way plugs are fully pushed into the two lower sockets on the left side of the burner.

Also check for permanent live on terminal L1 of burner plug No.1. Refer to Figure 8-5.

Note 3 - Has the boiler overheat thermostat tripped?

Unscrew and remove the black cover from the overheat reset button on the boiler control panel to check if boiler overheat thermostat has tripped. If YES, go to Section 12.4 for further guidance.

Note 4 - Has the pellet feed tube thermostat tripped?

Remove the steel retaining clip and disconnect the lead from the pellet feed tube (burn back) thermostat. Check the reset button to see if thermostat has tripped. If YES, go to Section 12.5 for further guidance.

Note 5 - Is the combustion chamber door closed and catch fully engaged?

The combustion chamber door is fitted with a safety interlock. Once the door catch is disengaged all power to the burner is interrupted. Refer to Section 10.5.2. Check that catch is FULLY engaged when door is closed.

Note 6 - Is the door micro-switch operational?

Check electrical continuity of door micro-switch. Replace if faulty. Refer to Figure 8-5 and 12-4.

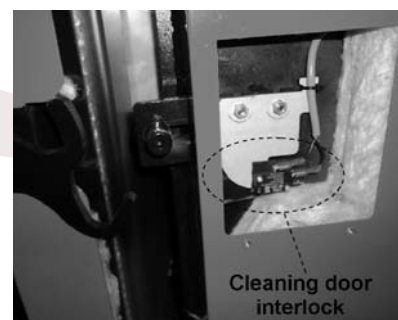


Figure 12-5: Location of door micro-switch

Note 7 - Is the fuse on the PCB OK?

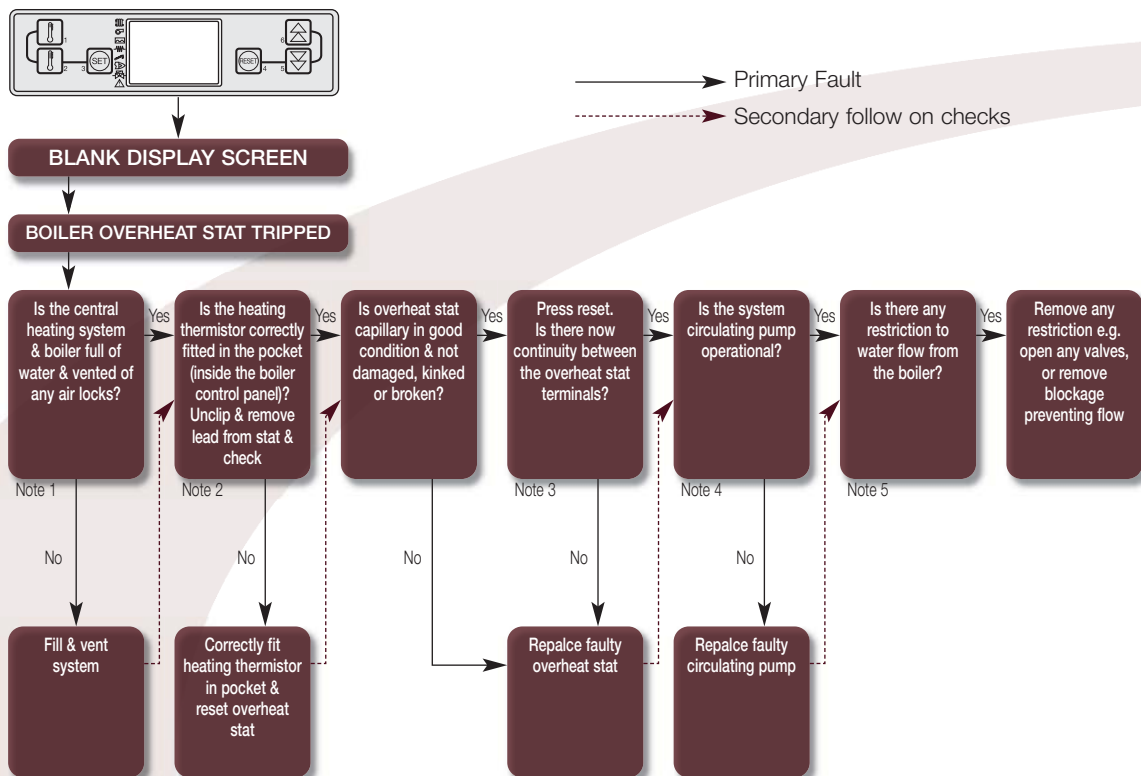
Remove fuse from holder on PCB and check. Replace if necessary. Fuse type F5AL250V. Refer to Figure 12-5.



Figure 12-6: Location of fuse on PCB

12 Fault Finding

12.4 Boiler Overheat Thermostat



Note 1 - Is heating system and boiler full of water and vented?

The central heating system must be free of any air locks. Ensure auto air vent on secondary heat exchanger (at left rear of the boiler) is open and vented. Vent the primary heat exchanger on the heating flow pipe. If installed on a sealed system: check expansion vessel charge pressure and correct as necessary. Check system pressure and top-up as necessary. Refer to Section 7 for sealed system details.

Note 2 - Is the heating thermistor correctly fitted?

Isolate electrical supply and remove boiler control panel cover. Check that the heating thermistor, and the overheat thermostat sensor, are correctly fitted into the pocket (inside the boiler control panel). Refer to Section 10.3.1. Ensure that both are held in place with the retaining clip supplied.

Also, check the condition of the thermistor and the overheat thermostat capillary for any damage, replace if necessary.

Note 3 - Is there continuity between the overheat thermostat terminals?

With electrical supply isolated, reset the overheat thermostat and check electrical continuity across the terminals. If no continuity found, replace the overheat thermostat.

Note that the thermostat continuity can be checked by removing the 7-way plug (plug No. 1) from the socket on the left of the burner and testing between terminals T1 and T2. Refer to Section 8 and Figure 8-5.

Note 4 - is the circulating pump operational?

With the burner ON/STANDBY switch set to 'STANDBY', reconnect the power supply to the boiler and check that the heating system controls are 'calling'. Set the switch to ON and the pump should be running.

If not check that:

- the pump is vented
- there is power to the pump
- that the pump is not seized/stuck

If pump has failed then replace it.

Note 5 - Is there any restriction to flow from the boiler?

Check that all valves on the heating circuit open and that there are no blockages.

Rectify as necessary.

12 Fault Finding

12.5 Pellet Tube Thermostat

Note 1 - Is the fault cleared by pressing the reset button?

Is the pellet feed tube less than 60°C? If not then allow it to cool before proceeding.

When cool, remove the steel retaining clip and disconnect the lead from the pellet feed tube (burn back) thermostat. Press the reset button on the thermostat.

Note 2 - Is feed pipe thermostat (burn back sensor) damaged or faulty?

Check the electrical continuity and condition of the thermostat. Replace if necessary.

Note 3 - Is the pellet delivery hose damaged/correctly fitted?

Check the condition of the hose. Is it damaged? If so replace it.

Is it fitted correctly at both ends – with an air tight fit onto both pellet feed pipe and pellet auger outlet? Rectify as necessary.

A damaged (or incorrectly fitted) pellet delivery hose can allow a back draught through the boiler, resulting in the pellet tube (burn back) thermostat operating and shutting down the burner.

Note 4 - Is the ash pan overflowing?

An overflowing ash pan, and ash build-up on the baffle, can block the passage of the combustion gases from the burner, causing them to back-up through the burner into the pellet feed tube. This will activate the pellet feed tube (burn back) thermostat.

The ash pan must be periodically emptied, and also any ash build-up on the baffle removed, by the user at MONTHLY intervals for the FIRST THREE MONTHS. After this the ash pan should be emptied, and ash on the baffle removed, regularly, on at least a monthly basis, or as indicated by the amount of ash found during the first three months cleaning. Refer to Section 1.5.

Note 5 - Is combustion chamber draught correct?

Check combustion chamber draught. Refer to Section 10.9 for procedure. If it is incorrect, **BEFORE** making any adjustment to the draught stabiliser, carry out the following checks as per the flow chart:

- Is condensate trap or pipework blocked or frozen? Defrost/remove blockage as necessary.
- Is ash pan overflowing? Empty and clean ash pan as necessary.
- Is the flue system incorrectly installed or blocked? Rectify as necessary.
- Is the flue fan operational?
- Is the room ventilation adequate?

If all the above are OK, then adjust the draught stabiliser as necessary to achieve the required combustion chamber draught. Refer to Section 10.9 for procedure.

Note 6 - Is condensate trap/pipe blocked?

Thoroughly check the entire condensate disposal system, including all the pipework and the trap(s), to ensure that it is not blocked or frozen (even partially).

If the condensate backs-up into the condensing heat exchanger, it can block the passage of the combustion gases from the burner, causing them to back-up through the boiler and burner into the pellet feed tube. This will activate the pellet feed tube (burn back) thermostat.

Note 7 - Is the flue correct type and correctly installed?

Only the Grant Black flue system can be used with the Grant Spira wood pellet boilers. Check that the flue has been correctly assembled and that the terminal position complies with the requirements of The Building Regulations – Approved Document J. Refer to Sections 7.2 for guidance.

Note 8 - Is flue fan operational and clean?

If the flue fan is not running, or is coated with ash, the draught in the combustion will be reduced causing the combustion gases from the burner to back-up through the burner into the pellet feed tube. This will activate the pellet feed tube (burn back) thermostat.

Note 9 - Is the room ventilation adequate?

Check that sufficient permanent ventilation is present in the room containing the boiler(s). Refer to Section 7.1 for guidance.

Lack of ventilation will lead to incomplete combustion, and an increased temperature in the pellet feed tube that will activate the burn back thermostat.

Note 10 - Is the wash system operating correctly?

Check the water supply to the wash system is connected and turned on. Operate the **CLEANING** switch and check the solenoid valve is opening and the water jets are all clear and spraying into heat exchanger tubes. Refer to Section 10.3.3.

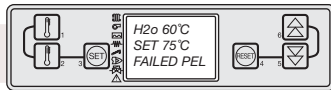
If necessary remove, clean and refit the wash system manifold. Refer to Section 11.6.2.

In hard water areas an anti-scale device should be fitted on the cold water supply to the wash system to prevent scale build-up in the manifold and jets.

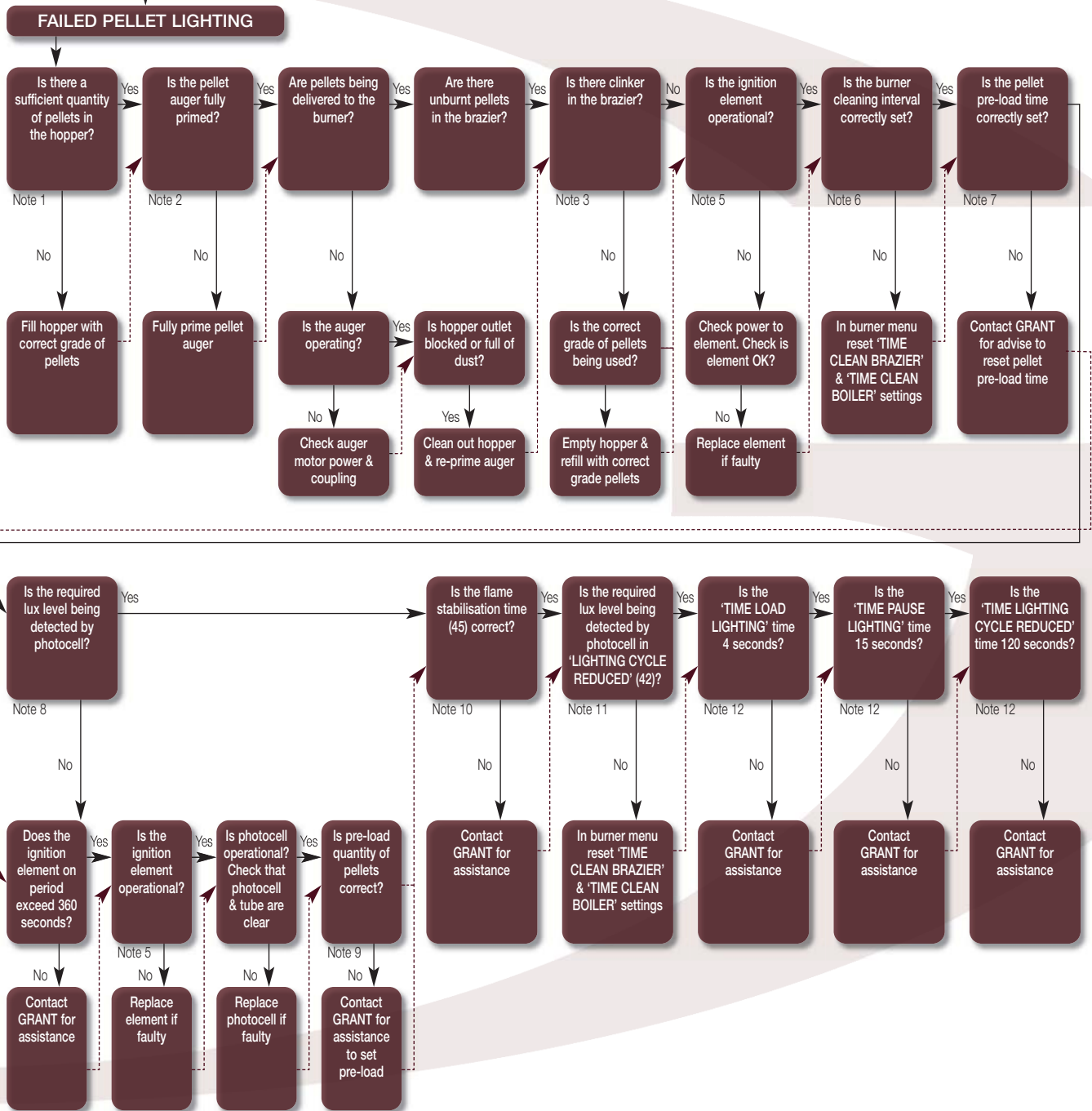
Note 11 - Is the boiler cleaning period correct?

Go to the 'CLEAN' sub menu of the burner control settings and check that both 'TIME CLEAN PERIOD' and 'TIME CLEAN BOILER' are correctly set. If not, re-set to the correct value. Refer to 9.7.1.3.

12.6 Failed Pellet Lighting



→ Primary Fault
 - - - - - Secondary follow on checks



12 Fault Finding

12.6 Failed Pellet Lighting

Note 1 - Is there a sufficient quantity of pellets in the pellet hopper?

The effect of insufficient pellets will depend on the type of pellet storage used, as follows:

Using a pellet hopper only – if there are insufficient pellets, the hopper contents switch will break the switched live to the boiler, causing **'WAIT BOILER THERMOSTAT'** to be displayed. Refill the hopper to start the boiler. Refer to Section 1.4.4 for further details.

Using a bulk pellet store – the hopper contents switch will control the operation of either the bulk store auger of Grant Spira-vac system. It will **NOT** interrupt the switched live to the boiler and thus **'WAIT BOILER THERMOSTAT'** will NOT be displayed.

The boiler would continue to operate until **ALL** pellets in the hopper are used and then stop, with **'FAILED PELLET LIGHTING'** displayed on the burner control screen.

In this case, check that:

- there are pellets in the bulk store
- the bulk store auger, or Grant Spira-vac system, is operating correctly (refer to instructions supplied with the Spira-vac system).

Rectify as necessary.

Note 2 - Is the pellet auger fully primed?

Refer to Section 10.7 for procedure to prime the auger.

Note 3 - Is there 'clinker' in the burner brazier?

Clinker is the hard deposits of solidified ash, containing sand particles, which the automatic burner cleaning system is unable to remove. Clinker is caused by using unsuitable pellets. See note 4.

If there is no clinker, but brazier is full of unburnt pellets, remove all pellets and clean brazier.

Note 4 - Are the correct pellets being used?

Check the pellets being used. Only EN Plus Grade A1 pellets conforming to EN14961 must be used with the Grant Spira boilers. Refer to Section 3.1 for details pellet specification.

Check the brazier cleaning setting – **'TIME CLEAN BRAZIER'**. Refer to Section 9.7.1.3 for settings.

Note 5 - Is the ignition element operational?

To check, isolate electrical supply and disconnect the two leads from the element cable. Grasp the black grommet and pull the complete element and cable from the tube. Check the condition of the ceramic element and that it is correctly fitted into the ceramic socket. Also check it is correctly positioned inside the tube. Refer to Section 10.8.3 for details.

Check across the two terminals for electrical continuity. Resistance of element $\approx 89\Omega$. If no continuity is found, then replace the element.

Note 6 - Is the burner cleaning interval correct?

Go to the **'CLEAN'** sub menu of the burner control settings and check that **'TIME CLEAN BRAZIER'** and **'TIME CLEAN BOILER'** are correctly set. Refer to 9.7.1.3.

Note 7 - Is the pellet pre-load time correct?

Measure the duration of the pellet pre-load period (i.e. whilst the **'STEP AUTO'** function is 40 in the **'VIEW'** menu), at the beginning of the burner lighting sequence. Refer to Section 9.3 for burner operating sequence and also Section 9.7.3 for **'VIEW'** menu folder. Pre-load should be 65 seconds. If not, contact Grant UK for technical advice on how to adjust the pre-load period.

Note 8 - Is the required LUX level being detected by the photocell?

In the **'WAIT LIGHTING (IGNITION)'** period of the burner lighting sequence (i.e. whilst the **'STEP AUTO'** function is 41 in the **'view'** menu), if the LUX value fails to reach 2 after a time of 360 seconds, then the error message **'FAILED PELLET LIGHTING'** is displayed. Refer to Section 9.7.3 for procedure to access LUX value in **'View'** menu.

Note 9 - Is the preload quantity of pellets correct?

When the pre-load operation is complete, the pellets should cover the heating element but not cover the opening at the end of the photocell tube.

Note 10 - Is the flame stabilization period correct?

The **'FLAME STABILISATION'** period (i.e. 'step auto' function 45 in the **'VIEW'** menu) is an over-run of the ignition element on period AFTER the 2 lux has been detected. This is factory set at 30 seconds.

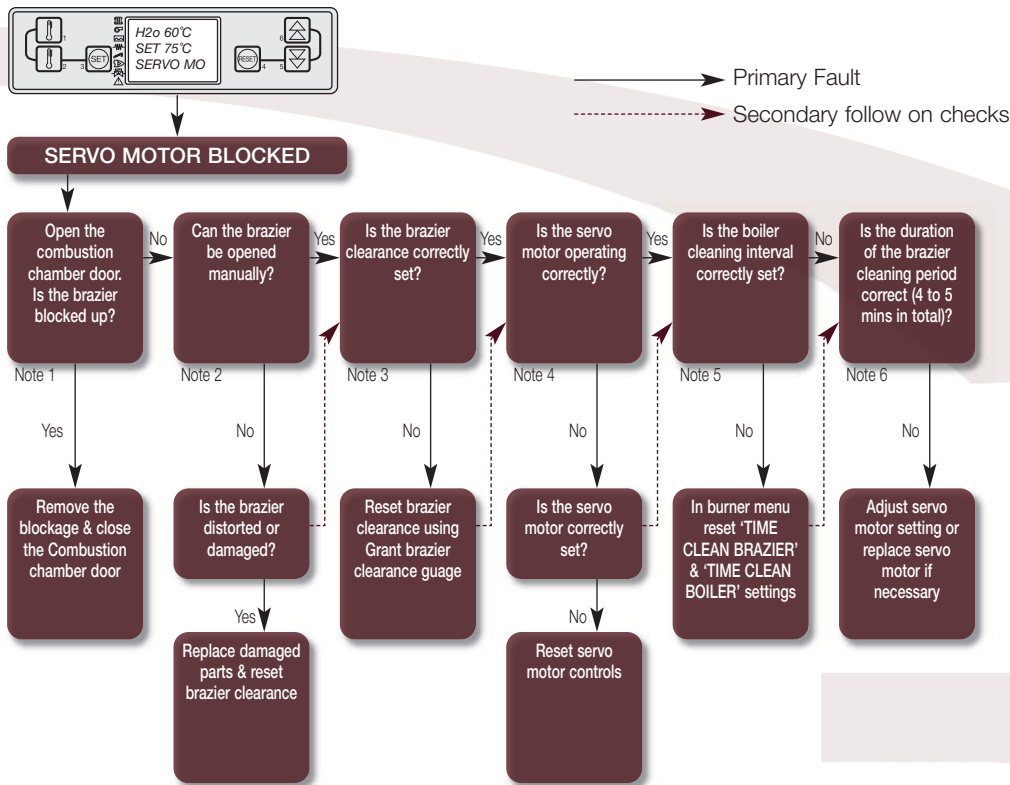
Note 11 - Is the required LUX level being detected by the photocell?

In the **'LIGHTING CYCLE REDUCED'** period of the burner lighting sequence (i.e. whilst the **'STEP AUTO'** function is 42 in the **'view'** menu), if the flame drops below 1 lux then the error message **'FAILED PELLET LIGHTING'** is displayed. Refer to Section 9.7.3 for procedure to access LUX value in **'View'** menu.

Note 12 - TO BE CONFIRMED

???

12.7 Servo Motor Blocked



Note 1 - Opening the combustion chamber door.

Before attempting to open the combustion chamber door, set the **ON/STANDBY** switch to **STANDBY**.

Note 2 - Can the brazier be opened manually?

First clear any blockage (clinker/ash) from the brazier. To open the brazier manually, operate the release switch on the servo motor. Refer to Section 11.7.2.

DO NOT FORCE THE BRAZIER OPEN WITHOUT OPERATING THE SERVO MOTOR RELEASE SWITCH OR THE SERVO MOTOR GEARS WILL BE DAMAGED AS A RESULT!

Note 3 - Is the brazier clearance correctly set?

To check the gap between the fixed and moving part of the brazier, use the brazier clearance gauge (supplied with the boiler). Refer to Section 11.7.2. If it is necessary to dismantle the brazier, the burner must be removed from the combustion chamber door. Refer to Section 11.7.

Note 4 - Is the servo motor operating correctly?

Set the **ON/STANDBY** switch to **STANDBY**. Go to the '**CLEAN**' sub menu of the burner control settings and set '**TIME CLEAN BRAZIER**' to 0.

Set the **ON/STANDBY** switch to **ON** and start the boiler. When the burner display shows '**100% POWER**' set the **ON/STANDBY** switch back to **STANDBY**. When the burner has completed the shut down process the brazier cleaning operation will start automatically. The burner control screen will first show '**BRAZIER CLEANING FORWARD**' for between 2 to 2½ minutes. Then the burner fan will start and the screen will show '**BRAZIER CLEANING BACK**' for between a further 2 to 2½ minutes. Thus the total time for the brazier cleaning operation is between 4 to 5 minutes.

Ensure '**TIME CLEAN BRAZIER**' is then reset to its original setting or the brazier cleaning operation will be repeated every time the burner shuts down.

Note 5 - Is the servo motor correctly set?

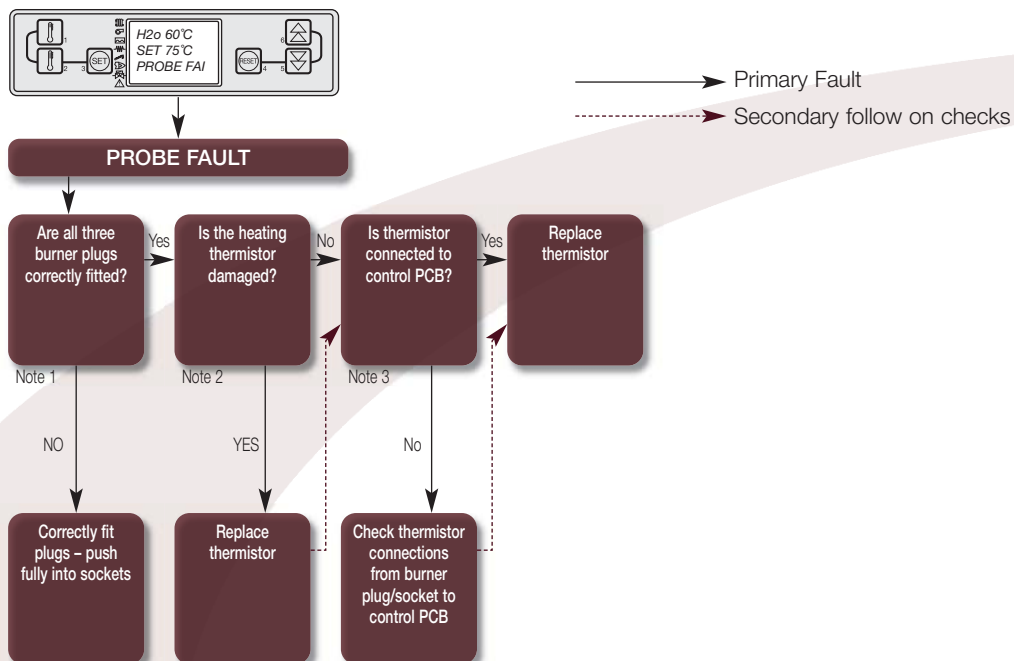
The stroke of the servo motor is factory set and should not be adjusted. Check with Grant UK for correct setting.

Note 6 - Is the boiler cleaning interval correct?

Go to the '**CLEAN**' sub menu of the burner control settings and check that '**TIME CLEAN BRAZIER**' and '**TIME CLEAN BOILER**' are correctly set. Refer to 9.7.1.3

12 Fault Finding

12.8 Probe Fault



Notes 1 - Are burner plugs correctly fitted?

Check that all three plugs are fully pushed into sockets on the left side of the burner – in particular plug No.2. Refer to Section 8 and Figure 8-5.

Note 2 - Is heating thermistor damaged?

Isolate electrical supply to boiler and remove boiler control panel cover. Check the condition of the thermistor for any damage and replace if necessary.

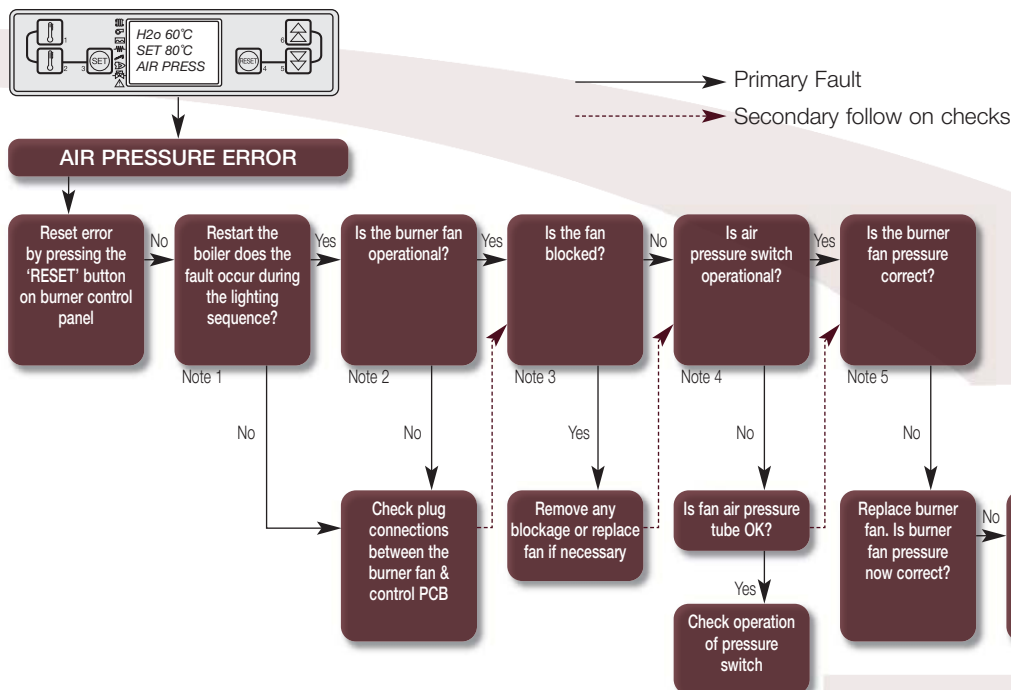
Check that the heating thermistor is correctly fitted into the pocket (inside the boiler control panel). Refer to Section 10.3.1. Ensure that both thermistor and thermostat sensor are held in place with the retaining clip supplied.

Note 3 - Is thermistor connected to burner PCB?

With electrical supply to boiler still isolated, remove both the burner cover and PCB cover. Check the thermistor connections to the PCB – from terminals S3 and B4 on plug/socket No.2. Refer to Section 8 and Figure 8-6.

If fault still exists, replace thermistor.

12.9 Air Pressure Error



Note 1 - Does fault occur during lighting sequence?

During the 'PRE-LOAD' operation, the burner controls check that burner fan is generating enough air pressure to close the air pressure switch. If the pressure switch is not closed during pre-load, then the warning 'AIR PRESSURE ERROR' is displayed on the burner screen.

Note 2 - Is the burner fan operational?

During the 'PELLET BURNER FIRING' operation the burner controls checks

that the burner fan speed is correct. It does not check if the fan is generating enough air pressure. If during the 'PELLET BURNER FIRING' operation the burner fan speed is not correct then the warning 'AIR PRESSURE ERROR' is displayed on the burner screen.

Check that the fan inlet is not blocked and that the fan blades are free to rotate. If necessary, thoroughly clean and remove any dust or debris. If fan still does not rotate freely, replace fan.

Note 3 - Is the air pressure switch operational?

Check that air supply tube is correctly connected to the pressure switch and not blocked or twisted. Refer to Figure 12-6. Rectify as necessary. Check condition of tube and replace if damaged. Check operation of air pressure switch.

Note 4 - Is fan air pressure tube OK?

Check that the plastic tube from the fan is not twisted, kinked or blocked. Check that it is correctly connected to the both the fan and pressure switch (lower of the two connections on the pressure switch).

Note 5 - Is burner fan pressure correct?

Using a digital manometer (set for positive pressure) check the pressure generated by the burner fan is the minimum of 0.8mbar required to activate the air pressure switch. Refer to Figure 12-7. If fan pressure is incorrect, replace fan.

If correct pressure is still not achieved, replace burner PCB.



Figure 12-6: Air pressure switch & fan

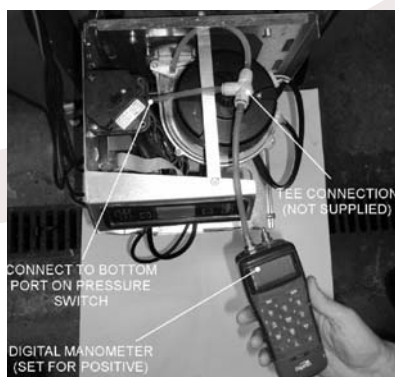


Figure 12-7: Checking air pressure from fan

13 Spare Parts

13.1 Burner

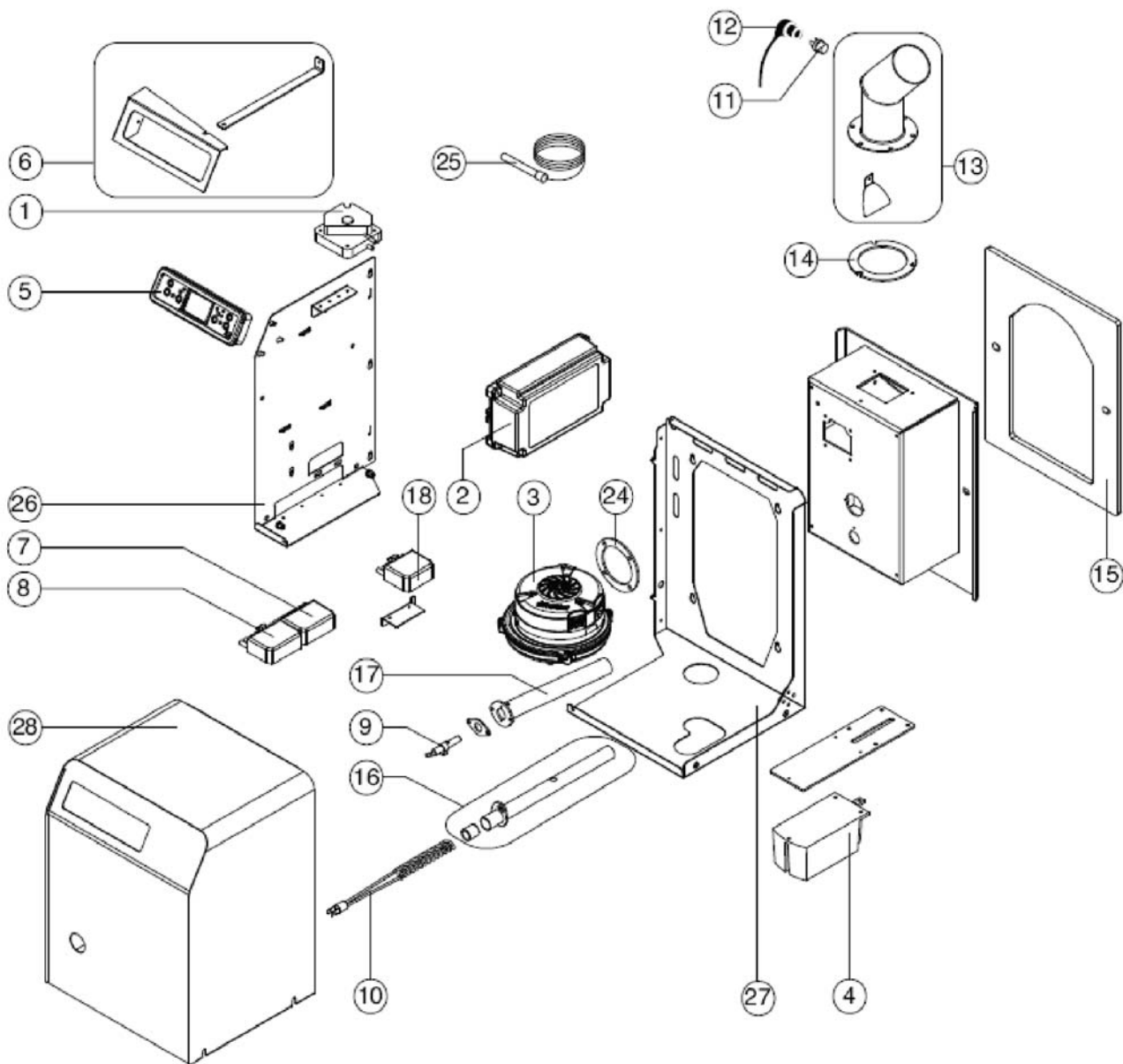


Figure 13-1: Burner Control Components – Exploded View

13.2 Burner Brazier

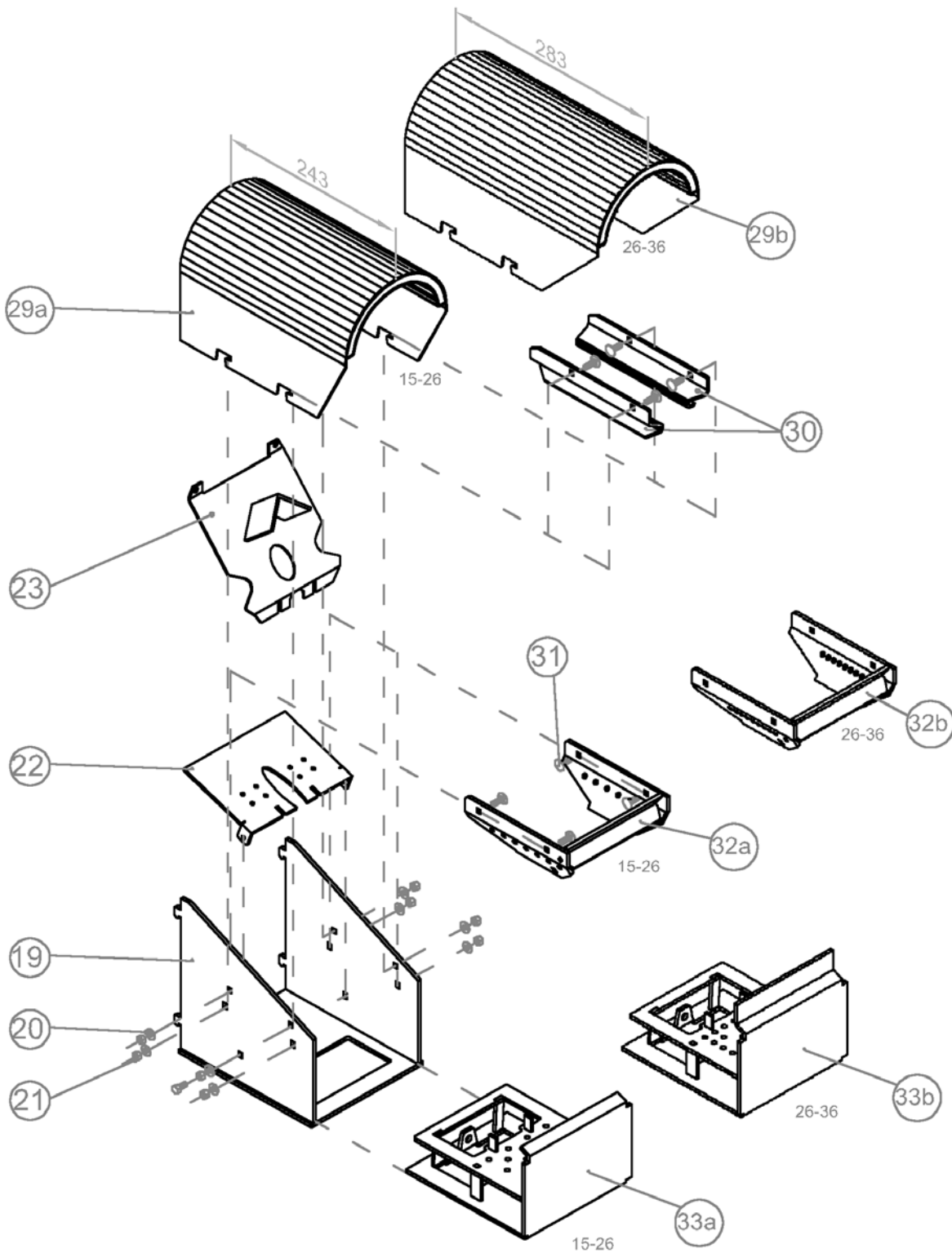


Figure 13-2: Burner Brazier Components – Exploded View

13 Spare Parts

13.3 Burner Parts List

Item	Description	Part No.	Quantity 6-26	Quantity 9-36
1	Pressure switch	WP111	1	1
2a	Primary printed circuit board 6-26	WP112A	1	-
2b	Primary printed circuit board 9-36	WP112B	-	1
3	Burner fan	WP03	1	1
4	Servomotor	WP04	1	1
5	LED display unit c/w enclosure	WP05	1	1
6	Mounting bracket set (LED display)	WP06	1	1
7	Electrical connector 7 way female	WP07	1	1
8	Electrical connector 7 way male	WP08	1	1
9	Photocell	WP09	1	1
10	Ignition element	WP10	1	1
11	Pellet feed tube thermostat	WP11	1	1
12	Pellet feed tube thermostat cover	WP12	1	1
13	Pellet feed tube	WP13	1	1
14	Pellet feed tube gasket	WP14	1	1
15	Burner mounting gasket	WP15	1	1
16	Ignition element housing	WP16	1	1
17	Photocell tube	WP17	1	1
18	Electrical connector 6 way male	WP18	1	1
19	Brazier chassis	WP19	1	1
20	M6 washer	WP20	8	8
21	M6 nut	WP21	8	8
22	Ignition element mounting plate	WP22	1	1
23	Photocell back plate	WP23	1	1
24	Burner fan gasket	WP24	1	1
25	Boiler water thermistor	WP25	1	1
26	Controls chassis left gable	WP26	1	1
27	Controls chassis back-plate & base	WP27	1	1
28	Main burner cover	WP28	1	1
29a	Flame hood 6-26	WP29A	1	-
29b	Flame hood 9-36	WP29B	-	1
30	Brazier flame plate set	WP130	1	1
31	M6 x 15 Coach bolt	WP31	8	8
32a	Grate enclosure (6-26)	WP32A	1	-
32b	Grate enclosure (9-36)	WP32B	-	1
33a	Brazier base assembly 6-26	WP33A	1	-
33b	Brazier base assembly 9-36	WP33B	-	1

13.4 Boiler

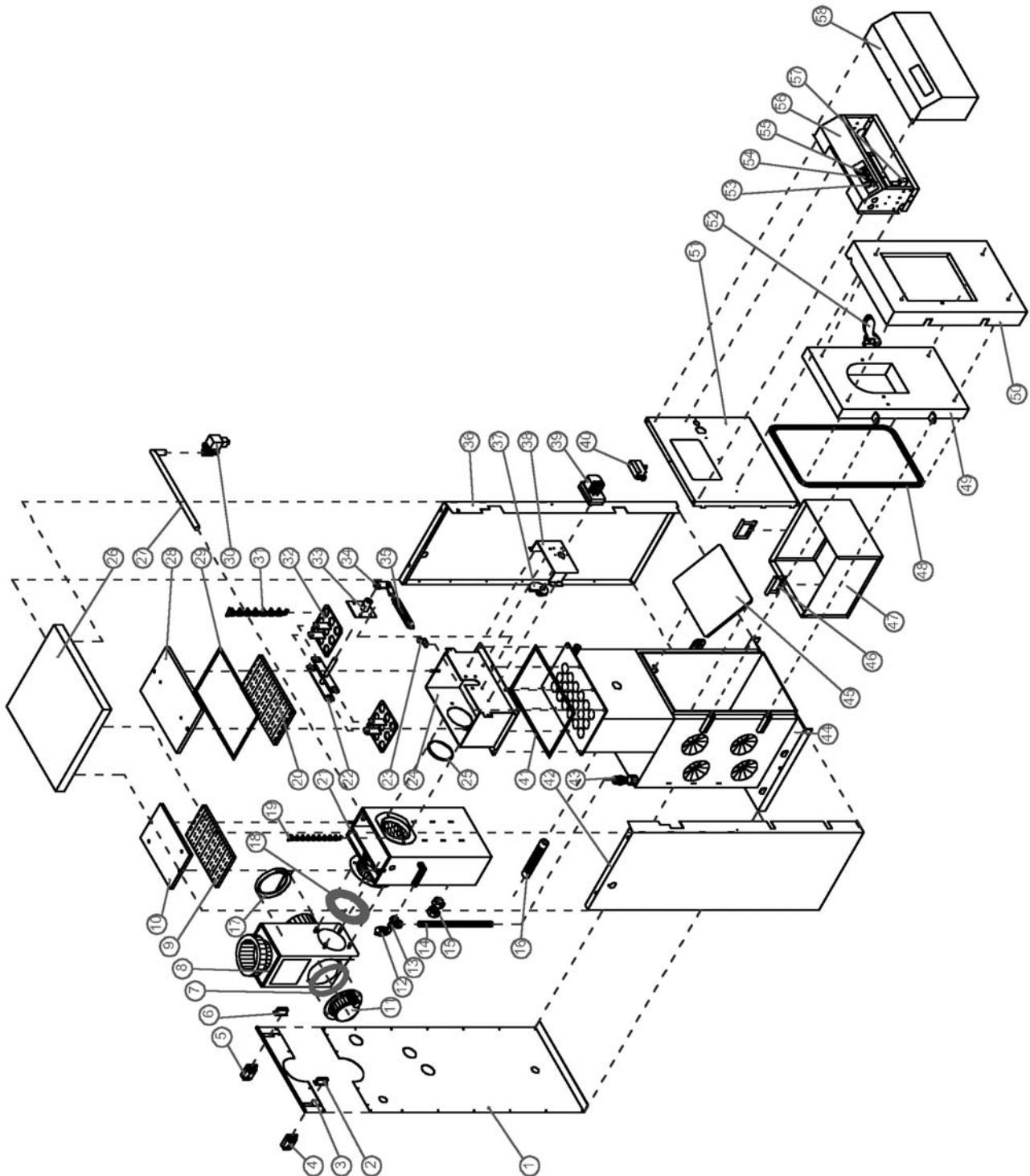


Figure 13-3: Boiler Components – Exploded View

13 Spare Parts

13.5 Boiler Parts List

Item	Description	Part No.	Quantity 6-26	Quantity 9-36
1	Rear lower panel	WP34	1	1
2	5 way mains connection –male fixed	WP 35	1	1
3	Rear upper panel	WP36	1	1
4	5 way mains connection –female detachable	WP37	1	1
5	5 way flue fan / cleaning solenoid connection –male detachable	WP38	1	1
6	5 way flue fan /cleaning solenoid connection – female fixed	WP39	1	1
7	Flue fan sealing gasket	WP40	1	1
8	Fan box	WP41	1	1
9	Cleaning door sealing gasket – Secondary 6-26	WP42	1	-
	Cleaning door sealing gasket – Secondary 9-26	WP43	-	1
10	Cleaning door –secondary 6-26	WP44	1	-
	Cleaning door –secondary 9-26	WP145	-	1
11	Flue fan	WP46	1	1
12	Air vent	MPCBS29	1	1
13	Air vent manifold	WP48	1	1
14	22mm Secondary to primary pipe 6-26	WP49	1	-
	22mm Secondary to primary pipe 9-36	WP50	-	1
15	Return assembly 6-26	WP51	1	-
	Return assembly 9-36	WP52	-	1
16	1" BSP Flow pipe 6-26	WP53	1	-
	1 ¼" BSP Flow pipe 9-36	WP54	-	1
17	Draught Stabilizer	WP55	1	1
18	Fan box/secondary gasket	WP56	1	1
19	Secondary heat-exchanger spiral baffle	WP57	30	40
20	Cleaning door sealing gasket – Primary 6-26	WP58	1	-
	Cleaning door sealing gasket – Primary 9-36	WP59	-	1
21	Secondary heat-exchanger 6-26	WP60	1	-
	Secondary heat-exchanger 9-36	WP61	-	1
22	Shaker arm assembly 6-26	WP62	1	-
	Shaker arm assembly 9-36	WP63	-	1
23	Spring anchor -fixed	WP64	1	1
24	Shaker chamber 6-26	WP65	1	-
	Shaker chamber 9-36	WP66	-	1
25	Primary/secondary gasket	WP67	1	1
26	Top panel 6-26	WP68	1	-
	Top panel 9-36	WP69	-	1
27	Cleaning pipe manifold 6-26	WP70	1	-
	Cleaning pipe manifold 9-36	WP71	-	1
28	Cleaning door-shaker chamber 6-26	WP72	1	-
	Cleaning door-shaker chamber 9-36	WP73	-	1
29	Fibre rope -shaker chamber door 6-26	WP74	1	-
	Fibre rope -shaker chamber door 9-36	WP75	-	1
30	Solenoid valve	WP76	1	1
31	Secondary heat-exchanger spiral baffle	WP77	18	24

13.5 Boiler Parts List continued

Item	Description	Part No.	Quantity 6-26	Quantity 9-36
32	Spiral hanger 6-26	WP78	1	-
	Spiral hanger 9-36	WP79	-	1
33	Shaker assembly mounting flange	WP80	1	1
34	Spring anchor - movable	WP81	1	1
35	Cleaning mechanism spring	WP82	1	1
36	Right side panel 6-26	WP83	1	-
	Right side panel 9-36	WP84	-	1
37	Cleaning mechanism cam	WP85	1	1
38	Cleaning motor mounting flange	WP86	1	1
39	Cleaning mechanism motor	WP87	1	1
40	Door interlock	WP88	1	1
41	Shaker chamber mounting gasket 6-26	WP89	1	-
	Shaker chamber mounting gasket 9-36	WP90	-	1
42	Left side panel 6-26	WP91	1	-
	Left side panel 9-36	WP92	-	1
43	Brass fitting 1" BSP x 22mm 311	WP93	1	-
	Brass fitting 1 1/4" BSP x 28mm 311	WP94	-	1
44	Primary heat-exchanger 6-26	WP95	1	-
	Primary heat-exchanger 9-36	WP96	-	1
45	Combustion chamber baffle 6-26	WP97	1	-
	Combustion chamber baffle 9-36	WP98	-	1
46	Ash pan handles	WP99	2	2
47	Ash pan 6-26	WP100	1	-
	Ash pan 9-36	WP101	-	1
48	Combustion chamber cleaning door rope	WP102	1	1
49	Combustion chamber cleaning door	WP103	1	1
50	Combustion chamber cleaning door panel	WP104	1	1
51	Front panel	WP105	1	1
52	Combustion chamber cleaning door handle	WP106	1	1
53	On/Off switch	EFBS22	1	1
54	Limit stat'	WP107	1	1
55	Momentary switch (double pole on/on)	WP108	1	1
56	Control panel chassis	WP109	1	1
57	Relay	MPCBS72X	1	1
58	Control panel cover	WP110	1	1
59	Plug (not show)			
60	Plug (not shown)			

Items not indexed are specific to the 9-36 model.

13 Spare Parts

13.6 Pellet Hopper (110kg)

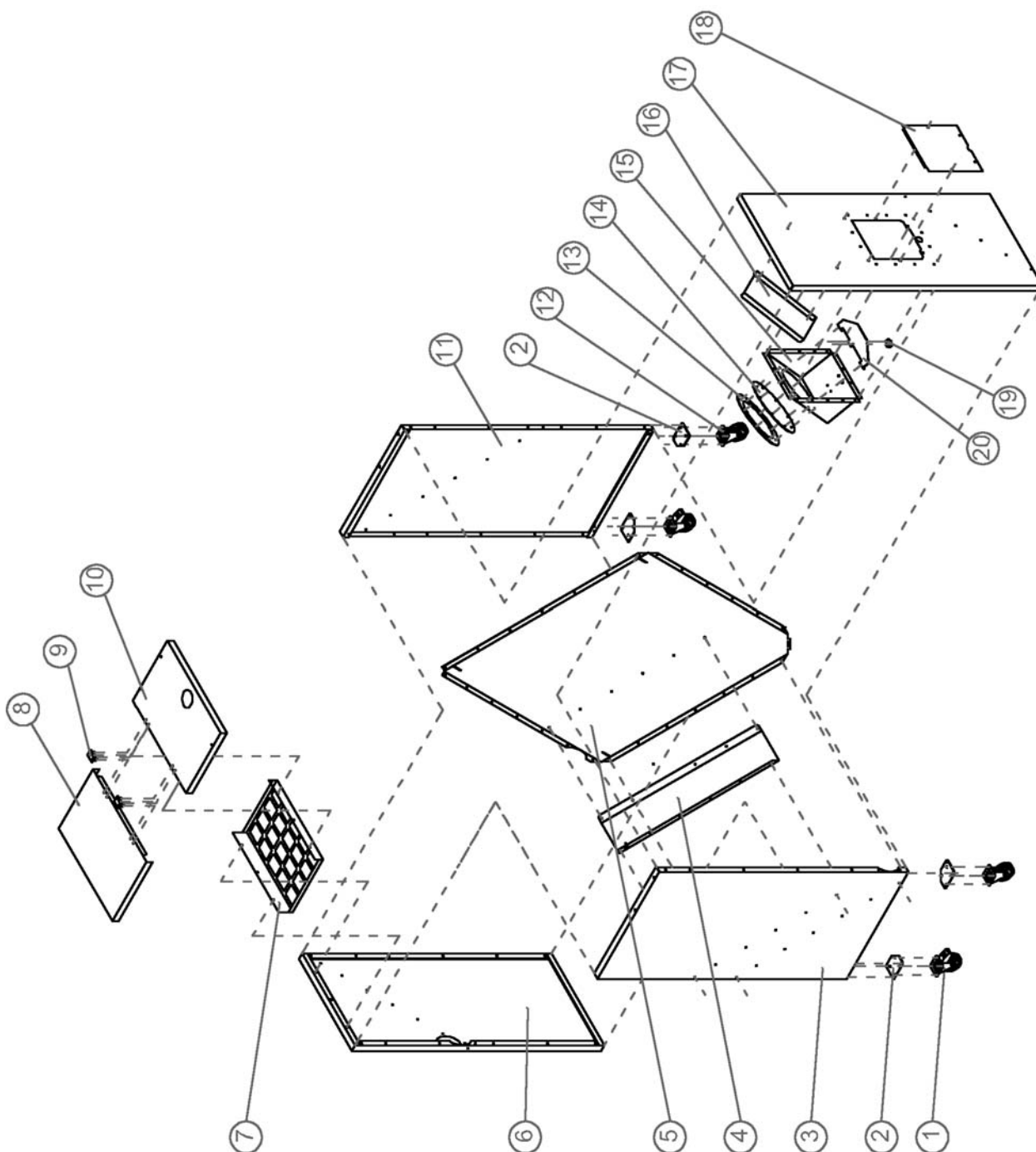


Figure 13-4: 110kg Pellet Hopper Components - Exploded View

13.7 Pellet Hopper (110kg) Parts List

Item	Description	Part No.	Quantity 6-26 & 9-36
1	Castor Wheel (c/w brake)	WP146	2
2	Caster wheel flange	WP147	4
3	Right side panel	WP148	1
4	Pellet feed Auger shield	WP149	1
5	Base	WP150	1
6	Front panel	WP151	1
7	Grid	WP152	1
8	Top front panel	WP153	1
9	Door hinge	WP154	2
10	Top rear panel	WP155	1
11	Left side panel	WP156	1
12	Castor Wheel	WP157	2
13	Rubber diaphragm flange	WP158	1
14	Rubber diaphragm	WP159	1
15	Wiring centre	WP160	1
16	Pellet damper	WP161	1
17	Rear panel	WP162	1
18	Wiring centre access cover	WP163	1
19	Low level limit switch	WP164	1
20	Limit switch bracket	WP165	1

14 Health and Safety Information

Under the Consumer Protection Act 1987 and Section 6 of the Health & safety at Work Act 1974, we are required to provide information on substances hazardous to health (COSHH Regulations 1988).

Adhesives, sealants and paints used in the manufacture of the product are cured and present no known hazards when used in the manner for which they are intended.

The following other materials are present in the product;

14.1 Insulation Materials

Material types; Ceramic fibre board, mineral wool.

Description; Rigid board, slabs, sleeves, gaskets, ropes.

Known Hazards; May cause temporary irritation or rash to skin. High dust levels may irritate eyes and upper respiratory system.

Precautions; Avoid unnecessary or rough handling, or harsh abrasion of boards. Normal handling and use of material should not produce high dust levels.

Avoid inhalation and contact with skin and eyes.

After handling always follow normal good hygiene practices.

Protection; Use disposable gloves, face mask and eye protection.

First Aid; Eyes – If irritation occurs, wash eyes with copious amounts of water. If symptoms persist, seek immediate medical advice.

Skin; If irritation occurs, wash under running water before washing with soap and water.

Inhalation; Remove to fresh air, drink water to clear throat and blow nose to remove dust/fibres.

Ingestion; Drink plenty of water.

14.2 Sealant and Adhesive

Material Types; Silicone elastomer.

Description; Sealant and adhesive.

Known Hazards; Irritation to eyes.

Precautions; Avoid inhalation of vapour, contact with eyes and prolonged or repeated contact with skin.

After handling always follow normal good hygiene practices.

Protection; Use eye protection. Rubber or plastic gloves should be worn where repeated contact occurs and a face mask worn when working in confined spaces.

First Aid; Eyes – Flush eyes with water for 15 minutes. See immediate medical attention.

Skin; Wipe off and wash with soap and water.

Inhalation; Remove to fresh air.

15 EC Declaration of Conformity

(In accordance with BS EN ISO/IEC 17050-1:2004)

We: GRANT ENGINEERING (IRL) LTD.
Of: Crinkle
Birr
Co. Offaly
Ireland
Telephone: 057 9120089
Fax: 057 9121060
Email: info@grantengineering.ie.
Website: www.grantengineering.ie

Declare that:

Equipment: Floor Standing Domestic Condensing Wood pellet boiler

Model name/number: Grant Spira 6-26 Wood Pellet Boiler
Grant Spira 9-36 Wood Pellet Boiler

In accordance with the following Directives:

2006/95/EC Conforms with the safety objectives of the Low Voltage Directive and its amending directives

2004/108/EC Conforms with the essential protection requirements of the Electromagnetic Compatibility Directive and its amending directives

has been designed and manufactured to the following specifications:

EN60335-1: 2002 + A1:2004 + A11:2004 + A2:2006 + A12:2006 + A13:2008 +A14:2010 (Clause 19.11.4 requirements)

EN 55014 -1: 2006 +A1:2009.

EN 303-5:1999

CE₁₁

16 Warranty

The Spira Wood Pellet Boiler Warranty

Dear Customer,
You are now the proud owner of a Grant Spira Wood Pellet Boiler from Grant Engineering (UK) Ltd, which has been designed to give years of reliable, trouble free operation.

Grant Engineering (UK) Ltd. guarantees the manufacture of the boiler including all electrical and mechanical components for a period of twelve months from the date installation, unless the installation was more than six months from the date of purchase, in which case the warranty period will commence six months from the date of purchase, provided the boiler is installed in full accordance with the installation instructions provided.

This will be extended to a period of **two years** if the boiler is registered with Grant UK within thirty days of installation and it is serviced at twelve month intervals. See Main Terms and Conditions below.

IMPORTANT

Please register your Grant Spira Wood Pellet boiler with Grant UK within thirty days of installation. To do so visit www.grantuk.com and follow the links to the 'Householder Zone', where you can register your boiler for a further **one year** warranty (giving **two years** from the date of purchase). This does not affect your statutory rights*.

Breakdown during the Manufacturer's Warranty

If your Grant boiler should fail within the warranty period, you must contact Grant Engineering (UK) Ltd, who will arrange for the repair under the terms of their warranty, providing that the boiler has been correctly installed, commissioned and serviced (if the appliance has been installed for more than twelve months) by a competent person and the fault is not due to tampering, running out of fuel, the use of unapproved wood pellets, contamination, system water contamination, misuse, or the failure of any external components not supplied by Grant UK (e.g. motorised valve, etc.). This extended **two year** warranty only applies if the boiler is registered with Grant UK within thirty days of installation.

In the first Instance:

Contact your installer or commissioning engineer to ensure that the fault does not lie with the system or any other components, or any incorrect setting of the system controls that falls outside the manufacturer's warranty otherwise a service charge could result.

If a fault covered by the manufacturer's warranty is found:

Ask your installer to contact Grant Engineering (UK) Ltd Service Department on 01380 736920 who will arrange for a qualified service engineer to attend to the fault.

Free of Charge Repairs:

During the first **two years** no charge for parts or labour will be made provided that the boiler has been installed and commissioned correctly in accordance with the manufacturer's instructions, it was registered with Grant UK within thirty days of installation and, for boilers over twelve months old, details of annual maintenance is available.

The following documents must be made available to Grant UK on request:

- Proof of purchase
- Grant Commissioning report form
- Service documents

Chargeable Repairs:

A charge may be made (if necessary following testing of parts at Grant UK) if the cause of the breakdown is due to any faults caused by the plumbing or heating system, e.g. contamination of parts due to system contamination, sludge, scale, debris or trapped air. See Extent of Manufacturer's Warranty below.

Extent of Manufacturer's Warranty:

The Manufacturer's Warranty does not cover the following:

- If the boiler has been installed over two years.
- If the boiler has not been commissioned, or serviced by a competent person in accordance with the installation and servicing manual.
- Faults due to tampering, unauthorised adjustment, neglect, misuse or operating the boiler contrary to the manufacturer's User Instructions.

- Damage due to external causes such as bad weather conditions (flood, storms, lightening, frost, snow, ice), fire, explosion, accident or theft.
- Faults due to incorrectly sized expansion vessel(s) or incorrect vessel charge pressure.
- Faults caused by external electrics and external components.
- Problems caused by lack of pellets, the use of unapproved pellets or faults with the pellet storage and supply system (if not supplied by Grant UK).
- Removing any pellet store or hopper contamination or blockages in the pellet augers, pellet hopper or bulk pellet store.
- Problems due to the flue system being incorrectly fitted or not installed to meet installation requirements.
- Boiler servicing, de-scaling or flushing.
- Cleaning condensate traps/pipework or thawing frozen condensate pipework.
- Electrical cables and plugs, heating system controls not supplied by Grant UK.
- Heating system components, such as radiators, pipes, fittings, pumps and valves not supplied by Grant UK.
- Consumable items including, but not limited to, gaskets, seals, etc.

Remember - before you contact Grant:

Ensure the boiler has been commissioned and serviced by a competent person in accordance with the Installation and servicing manual.

Ensure there is an adequate quantity of the approved type of pellets in the hopper (and bulk store if fitted) to supply the burner.

Ensure the problem is not being caused by the heating system or its controls. Consult the User Instructions supplied with the boiler for guidance.

NOTE

Do not wait until your wood pellet supply runs out before you order some more.

Dust in the bottom of the pellet store or hopper may prevent the supply of pellets to the burner. It is important that this is checked for and, if dust is present, removed on an annual service to prevent nuisance stoppage of the boiler.

Terms of Manufacturer's Guarantee

1. The Company shall mean Grant Engineering (UK) Limited.
2. The boiler is guaranteed for two years from the date of purchase providing that after twelve months the annual service has been completed and the boiler registered with the Company within thirty days of the installation date. Any work undertaken must be authorised by the Company and carried out by an approved service agent.
3. The shell (heat exchanger) of the pellet boiler supplied by the Company is covered by a five year parts only guarantee from the date of purchase subject to correct operation of the boiler. Proof of annual maintenance must be provided.
4. This guarantee does not cover breakdowns caused by incorrect installation, neglect, misuse, accident or failure to operate the boiler in accordance with the manufacturer's instructions.
5. The boiler is registered with the Company within thirty days of installation. Failure to do so does not affect your statutory rights.
6. This guarantee is not transferable unless sanctioned by the Company.
7. The Company will endeavour to provide prompt service in the unlikely event of a problem occurring, but cannot be held responsible for any consequences of delay however caused.
8. This guarantee applies to Grant boilers installed on the UK mainland, Isle of Man and Channel Islands only. Provision of in-warranty cover elsewhere in the UK is subject to agreement with the Company.
9. All claims under this guarantee must be made to the Company prior to any work being undertaken. Invoices for call out/repair work by any third party will not be accepted unless previously authorised by the Company.
10. Proof of purchase and date of installation, commissioning and service documents must be provided on request.
11. If a replacement boiler is supplied under the warranty (due to a manufacturing fault) the product warranty continues from the installation date of the original boiler, and not from the installation date of the replacement.

Hard Water Advice

If you live in a hard water area, protection against scaling of the wash system manifold in your boiler must be provided. You should fit an appropriate scale inhibitor or water softener as any breakdown caused by water scaling is not covered by either the manufacturer's warranty. Ask your installer for advice.



GRANT ENGINEERING (UK) LTD

Hopton House, Hopton Industrial Estate, Devizes, Wiltshire. SN10 2EU

Telephone: 01380 736920 Fax: 01380 736991

Email: info@grantuk.com Website: www.grantuk.com